Couples with Infertility: The Influence of Quality of Life, Relationship Satisfaction, Resilience, Depression, and Shame

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COUPLES WITH INFERTILITY: THE INFLUENCE OF QUALITY OF LIFE, RELATIONSHIP SATISFACTION, RESILIENCE, DEPRESSION, AND SHAME

by

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Counselor Education & School Psychology in the College of Community Innovation and Education at the University of Central Florida Orlando, Florida

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ABSTRACT

The purpose of this study was to investigate the directional relationship between fertility related quality of life, relationship satisfaction, resilience, depression, and shame amongst individuals and couples with infertility. This study tested the hypothesized directional relationship that individuals and couples with infertility \( N = 556 \) with a greater level of fertility related quality of life \( (\text{FertiQol}) \) would have (a) increased relationship satisfaction \( (\text{CSI}) \), (b) increased resilience \( (\text{CD-RISC}) \), (c) decreased depression \( (\text{PROMIS}) \), and (d) decreased shame \( (\text{FSCRS}) \), through structural equation modeling (SEM) and the actor partner interdependence model (APIM). Also, the researcher tested the dyadic influence of fertility related quality of life in couples \( (n = 52) \) on the constructs. The researcher then investigated the relationship between the constructs and the demographic, relational, and infertility related variables. Lastly, the researcher assessed group differences between Caucasian and Racially Diverse participants to determine the influence of race on fertility related quality of life, relationship satisfaction, resilience, depression, and shame. SEM analyses identified that the level of fertility related quality of life influenced resilience \( (18.23\% \text{ variance explained}) \), depression \( (63.04\% \text{ variance explained}) \), and shame \( (22.27\% \text{ variance explained}) \). Further, the Relational aspect of fertility related quality of life influenced relationship satisfaction \( (59.75\% \text{ variance explained}) \), and gender significantly influenced resilience with a medium effect \( (\beta = .309) \). Results of the APIM analysis identified two partner effects from the Relational aspect of fertility related quality of life to relationship satisfaction and shame. Lastly, the results identified significant differences in relationship satisfaction, shame, and value of spirituality between Caucasian and Racially Diverse participants. Study implications include: (a) greater knowledge for individual counseling, couples counseling, and integrated care counselors, (b) greater understanding of
interventions to promote positive relationship satisfaction in couples, and (c) greater understanding of how to enhance counselor training when working with couples with infertility.

*Keywords:* Infertility, couples, fertility related quality of life, relationship satisfaction, resilience, depression, shame, Biopsychosocial Theory of Infertility, structural equation modeling, actor partner interdependence modeling, and Racially Diverse.
This dissertation is dedicated to Joshua Wilson. Thank you for your steadfast love and support.
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CHAPTER ONE: INTRODUCTION

This investigation aimed to test the relationship between fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [FertiQol; Boivin et al., 2011]), relationship satisfaction (as measured by the *Couple Satisfaction Index* [CSI; Funk & Rogge, 2007]), resilience (as measured by the *Connor–Davidson Resilience Scale* [CD-RISC; Campbell-Sills & Stein, 2007]), depression (as measure by the *PROMIS Depression Instrument* [PROMIS Depression; Cella et al., 2010]), and shame (as measured by the *The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [FSCRS; 3/21/2021 5:13:00 PM]) amongst individuals and couples who experience infertility, through structural equation modeling (SEM; Kline, 2016) and the actor partner interdependence model (APIM; Kenny et al., 2006) estimated by SEM.

**Statement of the Problem**

Infertility affects approximately 12–15% of couples, exacting a huge emotional and psychological toll for those impacted (Shreffler et al., 2017). Infertility is defined as the inability to become pregnant after 12 months of regular, unprotected sex (American Society for Reproductive Medicine, 2013; Shreffler et al., 2017); however, women begin to feel the fear and frustration associated with symptoms of infertility as early as six months (Jacobson et al., 2018). Infertility increases the risk for anxiety and depression, making it a significant public health concern (Shreffler et al., 2017; Wamser-Nanney, 2019). In fact, researchers who conducted a study with 488 American women, found that those with infertility demonstrated anxiety and depression similar to those with cancer (Burns, 2007; Domar & Friedman, 1993). Researchers have found that both men and women with infertility tend to have significant levels of distress. In a related study including 200 couples at a fertility clinic, results indicated that 15% of the men...
and 50% of the women described infertility as “the most upsetting experience of their lives” (Freeman et al., 1985, p. 50). Moreover, individuals with infertility tend to suffer silently due to the shame of not being able to conceive, which compounds on symptoms of depression (Ceballo et al., 2015; Facchin et al., 2019). Furthermore, due to these feelings of shame and privacy, many women will not share with their partners the depth and extent of distress the infertility causes them (Ceballo et al., 2015), increasing disconnection in the couple relationship (Chaves et al., 2019). The struggle of infertility, along with all its inherent complications, has impacted couples for generations — and yet there is still so much to learn about that impact. Currently, couples are waiting longer to attempt to have children, potentially increasing infertility rates (Shreffler et al., 2017), highlighting the opportunity for the counseling field to include this prevalent topic in research to better prepare mental health counselors and marriage and family therapists working with couples.

Infertility is more than just a biological issue, for it affects the psychological, emotional, and relational aspects of an individual’s life (Shreffler et al., 2017; Wamser-Nanney, 2019; Ying & Loke, 2016). For many women, their hope to become a mother is embedded within their concept of identity; when they are unable to conceive, there is a deep and painful loss that occurs (Ceballo et al., 2015). Couples may try to become pregnant and find instead the loss of a future they expected. Moreover, infertility is not a singular loss, but an ongoing loss, as it can span the remainder of the couple’s lives together (James & Singh, 2018; Ussher & Perz, 2019).

Infertility can cause partners to experience a sense of shame or a faultiness within themselves, leading them to suffer in silence rather than share their distress with their partner (Ceballo et al., 2015). Infertility is involuntary, there is not a behavior or action that a partner can adjust, but rather it presents a new reality to which the couple must now adapt. That said, there
are actions that couples can take to endure the distress of infertility. The promotion of a cohesive couple relationship has the power to increase resiliency and decrease infertility-related stress (Chaves et al., 2019). Hence, it is necessary to investigate the effect of infertility on the couple relationship to better understand the unique and nuanced needs of this population.

Research that focuses on couples experiencing infertility mainly occurs in other countries, limiting the empirical knowledge base of the impact of infertility for men and women in the United States (Donarelli et al., 2016; Kroemeke & Kubicka, 2017; Maroufizadeh et al., 2018a). Furthermore, the majority of literature on infertility is found in disciplines other than counseling, including nursing/medicine (Boivin & Gameiro, 2015; Roudsari & Bidgoli, 2017; Martins et al., 2014; Ussher & Perz, 2019), psychiatry (Yu et al., 2014), psychology (Donarelli et al., 2016; Kroemeke & Kubicka, 2017; Maroufizadeh et al., 2018a) and health psychology (Facchin et al., 2019; Moura-Ramos et al., 2016). In addition to limited research in counseling, there are glaring gaps in the literature. The largest gaps in research include a lack of racial diversity when investigating infertility (Ussher & Perz, 2019) and a lack of including the couple in mental health treatment (Shreffler et al., 2017). Considering infertility effects both partners’ psychological and relational health, it is pivotal that the counseling field address this unique stressor for couples and counselors working with couples can help the couple work through their emotional and relational distress. As the counseling field addresses this valuable issue, couples can bring to light their pain and struggle with infertility, to move past suffering in silence and shame, and to learn how to unlock the healing power of their own relationships.

**Theoretical Foundation**

Several theoretical frameworks may be appropriate for conceptualizing the couples’ and individual’s experience in coping with stressful live events. However, two theoretical
frameworks have been selected to work in conjunction with each other: (a) the Biopsychosocial Theory of Infertility, which conceptualizes the individual’s experience, and (b) the Theory of Dyadic Coping, which conceptualizes the couple’s experience with stressful life events (Bodenmann, 1995). The intertwining of these two theories provided a solid foundation for understanding the impact of infertility on both the couple and the individual.

**Biopsychosocial Theory of Infertility**

Gerrity (2001) proposed the Biopsychosocial Theory of Infertility to address the effect of infertility on the biological, psychological, and relational aspects of an individual. The Biopsychosocial Theory of Infertility combines the traditional biopsychosocial model with the theory of stress and coping (Gerrity, 2001). The theory acknowledges that infertility impacts the individual beyond the biological component of being unable to conceive. Primarily, the theory posits that the mediators of coping and social support affect the individual’s overall sense of well-being (Gerrity, 2001). Hence, addressing the individual’s need for social support, such as from a partner, can increase positive coping and decrease infertility-related stress (Gerrity, 2001). Considering the individual’s experience of infertility will affect the couple relationship, this model complements a theory where both partner’s experience is accounted for, such as dyadic coping (Chaves et al., 2019).

**Theory of Dyadic Coping**

Dyadic Coping is a process where partners communicate their stress to each other, either verbally or non-verbally, and then work together to cope with the stressful event (Bodenmann, 1995; Kayser & Bodenmann, 2005). The foundational principles of Dyadic Coping include interdependence of the partners, a common stressful event, and the goal to engage in mutual coping (Bodenmann, 1995; Kayser & Bodenmann, 2005). The primary objectives of Dyadic
Coping include each partner working to reduce stress in the other and to achieve an overall increase in relationship satisfaction (Falconier et al., 2015; Kayser & Bodenmann, 2005). Dyadic Coping is a couples response to dyadic stress and is comprised of essential assumptions and appraisals of how the partners communicate their stress to each other (Bodenmann, 1995; Kayser & Bodenmann, 2005). The Theory of Dyadic Coping underpins the concept of dyadic stress and maintains assumptions related to the stress communication process between partners (Bodenmann, 1995; Kayser & Bodenmann, 2005).

**Dyadic Stress**

Dyadic stress is a stressful event or experience that effects both partners in the relationship, either directly or indirectly (Bodenmann, 1995; Kayser & Bodenmann, 2005). The three main elements involved in dyadic stress includes: (a) a common stressor between both partners, (b) a stressor that affects the emotional intimacy in the relationship, and (c) a stressor that involves a desire to maintain the relationship amidst the stressful event (Bodenmann, 1995; Kayser & Bodenmann, 2005). The following assumptions and synopsis of the stress communication process further conceptualizes the process of Dyadic Coping.

**Assumptions**

There are three main assumptions that undergird Dyadic Coping. First, Dyadic Coping is a systemic form of coping as one partner’s appraisal of stress is influenced by the other partner (Kayser & Bodenmann, 2005). Second, Dyadic Coping is an extension of individual coping that adds additional support to the individual, especially when individual coping is no longer effective. Third, Dyadic Coping can produce positive or negative coping styles. Positive Dyadic Coping includes the partners reducing each other’s level of stress and focusing on sustaining the
relationship, while negative Dyadic Coping includes disconnection, hostility, and ambivalence (Kayser & Bodenmann, 2005).

**Stress Communication Process**

Dyadic Coping involves conceptualizing the partners’ stress communication patterns as primary appraisals, secondary appraisals, and re-appraisals (Bodenmann, 1995; Kayser & Bodenmann, 2005). Appraisals can be communicated verbally or non-verbally and involve self-perception of the stressful event, partner’s perception of the stressful event, and the process of both partner’s communicating their perceptions and engaging in a joint effort to cope with the stressful event (Bodenmann, 1995; Kayser & Bodenmann, 2005). Overall, positive Dyadic Coping can increase relationship satisfaction and decrease individual stress levels (Bodenmann, 1995; Chaves et al., 2019; Falconier et al., 2015; Kayser & Bodenmann, 2005).

Considering that infertility is both an individual and a couple experience, it is necessary to provide a theoretical framework that addresses both aspects. In sum, the Biopsychosocial Theory of Infertility, which addresses the individual experience, and the Theory of Dyadic Coping, which addresses the couple experience, complement each other as a theoretical foundation in conceptualizing the experience of infertility. The described theoretical framework guided the researcher during this investigation.

**Operational Definitions**

This investigation measured the following constructs: fertility related quality of life, relationship satisfaction, resilience, depression, and shame as they relate to individuals and couples experiencing infertility.

Infertility is defined as twelve months or longer of unprotected sex without becoming pregnant for women of ages 20–34 years, or six months or longer of unprotected sex without
becoming pregnant for women aged 35 years or older, according to the 2013 American Society for Reproductive Medicine (2013). Moreover, women begin to feel the fear and frustration associated with symptoms of infertility as early as six months (Jacobson et al., 2018).

**Fertility Quality of Life**

Fertility quality of life is the impact of infertility on the individual’s quality of life as defined by The World Health Organization (WHO). The WHO defines Quality of life (Qol) as an “individual’s perceptions of their position in life, in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns” (WHO-QOL, 1998, p. 3). Fertility related quality of life then, is determined by the effect of infertility problems on the emotional, mind-body, relational and social aspects of an individual’s life (Boivin et al., 2011).

**Relationship Satisfaction**

Relationship satisfaction can be defined as the satisfaction that partners experience in the relationship (Carlson et al., 2013; Funk & Rogge, 2007). The couple’s satisfaction with the relationship will shed light on how emotionally connected the partners feel as well as the couples’ experience of cohesion when facing difficult circumstances. Relationship satisfaction has also been found to be related to quality of life (Wood et al., 2019).

**Resilience**

Resilience can be defined as an individual’s ability to adapt and maintain protective factors in the face of adversity, extreme stress, or trauma (Bonanno, 2008; Luthar et al., 2000; Rutter, 2013).
Depression

Depression is defined as an individual’s experiencing sadness, guilt, self-criticism, views loneliness, decreased feelings of purpose and loss of interest in connecting with others (Cella et al., 2010).

Shame

Shame is defined as feeling inferior, fragile, and a sense of internal emptiness and loneliness (Cook, 2001;). There are two different types of shame, trait shame and state shame (Claesson, 2002). Trait shame best describes the fundamental, emotionally painful experience of infertility, because it is believed that infertility affects the very core of some women who find their identity in being a mother (Rosario & White, 2006), hence, this study focused on feelings of internalized trait shame related to the experience of infertility. Additionally, shame can manifest as feeling worthless and inadequate brought on by self-critical as well as negative thoughts and feelings, invoking a self-hatred (Gilbert et al., 2004). Alternatively, individuals have the ability to emotionally reassure themselves, counteracting the effect of shame (Gilbert et al., 2004). Hence, this study investigated the individual’s feelings of shame related their infertility by measuring feelings of inadequacy and self-hatred as well as the ability to reassure oneself.

Purpose of Study

The purpose of this study was to gain fundamental knowledge about the dyadic influence of infertility on couples. In order to successfully treat couples with infertility, it is necessary to understand how infertility affects the mental health, relationship quality, and quality of life of both partners, as well as how each partner’s experience of infertility influences the other. Such knowledge can enhance treatment outcomes by addressing the specific needs of the couple.
Understanding how infertility affects both the couple relationship as well as the individual coping with infertility is critical knowledge we aimed to gain from this investigation.

Additionally, the unbalanced saturation of Caucasian representation within samples of infertility studies conducted within the United States illustrates a significant need to incorporate ethnic and racial diversity when investigating infertility (Rosario & White, 2006). As such, a secondary purpose of this study was to intentionally broaden sample diversity by recruiting ethnically and racially diverse participants. In turn, including a diverse sample could expand the counseling literature to better understand the unique needs of diverse couples with infertility.

The methodological purpose of this investigation was to test and model the relationship between fertility related quality of life (Boivin et al., 2011), relationship satisfaction (Funk & Rogge, 2007), resilience (Campbell-Sills & Stein, 2007), depression (Cella et al., 2010), and shame (Cook, 2001; Rosario & White, 2006) among couples who experience infertility through structural equation modeling (SEM; Kline, 2016) and the actor partner interdependence model (APIM; Kenny et al., 2006). SEM tested the effect of fertility related quality of life on all other constructs at the individual level, while APIM tested the effect of fertility related quality of life on all other constructs at the dyadic level.

**Research Questions and Hypothesis**

The aim of this investigation was to assess the influence of fertility related quality of life in couples with infertility on both partners’ relationship satisfaction, resilience, depression, and shame. The primary research hypothesis and the exploratory research question are below.
Research Hypothesis

The research hypothesis for this current study was: Couples experiencing infertility with higher levels of fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]) will have increased relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), increased resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), decreased depression (as measure by the PROMIS Depression Instrument [Cella et al., 2010]), and decreased shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004]) with gender as a covariate (See Figure 1).

Exploratory Research Question 1

What are the actor and partner effects among couples fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]), relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), depression (as measure by the PROMIS Depression Instrument [Cella et al., 2010]), and shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004])?

Exploratory Research Question 2a

What are the relationships among the demographic variables (i.e., gender, race, ethnicity, education, income, relationship length, infertility length, type of infertility, cause of infertility, and the scale questions including treatment access and the individual’s value of spirituality) and (a) fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]), (b) relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), (c) resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-
Sills & Stein, 2007]), (d) depression (as measured by the PROMIS Depression Instrument [Cella et al., 2010]), and (e) shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004])?

**Exploratory Research Question 2b**

What is the relationship between couples’ race and (a) fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]), (b) relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), (c) resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), (d) depression (as measured by the PROMIS Depression Instrument [Cella et al., 2010]), and (e) shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004])?

![Figure 1. Research Hypothesis](image-url)

*Figure 1. Research Hypothesis*
Significance of the Study

Investigating infertility through dyadic analysis, with the inclusion of both partners is novel and additive to the counseling literature. The significance of this study aimed to enhance mental health and marriage and family counselors’ knowledge in working with couples experiencing infertility, as they will have a better understanding of how infertility can affect the couple’s relationship and how enhancements in the couple’s relationship can better prepare them for facing the challenges of infertility (Ceballo et al., 2015; Falconier et al., 2015; Martins et al., 2014; Peterson et al., 2007; Shreffler et al., 2017). Counselors work with couples with a host of presenting concerns, yet if infertility is present and the counselor either (a) does not know to screen for the issue, or (b) is unaware of how infertility indeed impacts the couple relationship, they will be unable optimally treat the couple (Young et al., 2021). Hence, the knowledge gained from this investigation can inform future interventions specifically tailored to addressing the needs of couples with infertility, contribute to the development of future competencies for counselors working with infertility, highlight the benefit for including the topic of infertility in counseling programs, and provide implications for counselors working in medical settings.

Interventions can include workshops focused on facilitating dyadic coping and promoting relationship satisfaction to increase resilience and decrease depression and shame in individuals and couples with infertility. As the counseling field furthers in the knowledge of working with couples facing infertility, counselors can later establish competencies for working with this population. Also, counseling programs can include more complex information on the experience of infertility in couples within courses such as family and couples counseling. Furthermore, as many individuals feel shame when treated for infertility (Ceballo et al., 2015), counselors working in medical settings can provide support to medical personnel that are working with
individuals and couples with infertility to enhance communication and readily address shame (Shreffler et al., 2017). Additionally, since the experience of medical procedures can be traumatizing for the individual as well as anxiety-provoking for the couple (Shreffler et al., 2017), the counselor can be available to offer behavioral treatment suggestions for the medical staff, as well as to provide emotional support for the couple as they move through the medical process (Boivin & Gameiro, 2015). Overall, the findings of this investigation will inform the practices of counselors across a variety of settings and in turn, promote healthy and effective coping for couples with infertility.

Methods

The following section will outline the research design, population and sampling, recruitment, procedures, data collection, and instruments. Prior to data analysis, the study was approved by the university institutional review board. The methods of the study were designed to appropriately measure the effect of fertility related quality of life on relationship satisfaction, resilience, depression, and shame in individuals and couples with primary or secondary infertility.

Research Design

This study used a descriptive, correlational research design to examine the directional relationship between fertility related quality of life, relationship satisfaction, resilience, depression, and shame amongst individuals and couples with infertility. Correlational methods allowed the researcher to examine the direction and strength of the relationship as well as predict the influence of one variable on another (Creswell, 2014). Considering this investigation is a correlational study, causation could not be determined. However, this study utilized robust analyses, such as Structural Equation Modeling (SEM) and Actor Partner Interdependence
Modeling (APIM), that allowed for the exploration of possible causal relationships (Kenny et al., 2006; Kline, 2016; Tabachnick & Fidell, 2013). Actor Partner Interdependence Modeling is the optimal design to detect how partners influence each other when in a relationship and how that influence can affect the individual or the couple as a dyad (APIM; Kenny et al., 2006).

**Population and Sampling**

The population of interest for this study were diverse couples that have been experiencing infertility for a minimum of six months. Considering this study employed an Actor-Partner Interdependence Model, it was encouraged that both members of the couple were willing to participate in the study, however, individuals were welcome. Convenience sampling and community-based recruitment of participants were utilized to recruit individuals and couples with infertility.

**Sample Size**

The researcher utilized two statistical calculators to conduct a priori power analyses. Using the statistical calculator, www.danielsoper.com (Soper, 2018), the researcher conducted an a priori power analysis. Based on Soper’s (2018) statistical calculator, and for this particular investigation, there is a recommended sample size of 400 participants to identify a small effect size (0.2) at a high power (0.8) with five latent variables (i.e., *Fertility Quality of Life*, *Relationship Satisfaction, Resilience, Depression, and Shame*), and ten observed variables (i.e., *Fertility Quality of Life subscale total scores*[*Emotional, Mind-Body, Relational, Social*], *Couples Satisfaction Inventory total score, Resilience total score, Depression total score, and Shame subscale total scores*[*Inadequate Self, Hated Self, Reassured Self*]) at the probability of p < .05. Additionally, using the statistical calculator, the APIMPower application on www.Davidakenny.net (Kenny & Ackerman, 2019), the researcher conducted a second a priori
power analysis. Based on Kenny’s (2019) statistical calculator, there is a recommended sample size of 91 dyads to detect actor effects and partner effects to achieve a small effect size (0.20) at a high power (0.8) with the probability of $p < .05$. Considering that the primary statistical analysis used was SEM, the targeted sample was 400 participants including 91 dyads, as that sample size would achieve necessary power through structural equation modeling (Kline, 2010), as well as meet the minimum recommended sample size to detect actor and partner effects (Kenny & Ackerman, 2019).

**Inclusion and Exclusion Criteria.** To be included in the study, participants needed to meet the following criteria: over the age of 18 years old, identify as a couple relationship together for a minimum of one year, experience self-identified primary or secondary infertility for a minimum of six months, and willingness of both partners to participate in the study, although individual partners are encouraged to still participate. To confirm that participants met the appropriate inclusion criteria, demographic questions were included asking the participant if they experienced infertility for less than six months. The intention was for participants who selected that they experienced infertility for less than six months to be excluded from the study, however, all participants selected that they experienced infertility for a minimum of six months.

**Sampling Procedure**

The population of interest for this study were individuals and couples that are experiencing infertility. The recognized target sample were individuals and couples that met the specific inclusion criteria and were willing to participate in the study. The researcher developed contacts that had access to the targeted population. To meet the sample size requirement, the sample needed to be recruited from a variety of settings with access to a diverse population through convenience and snowball sampling. Also, based on previous infertility research
response rates for face to face and online recruitment, studies have indicated a response rate of 82% for face to face surveys (Maroufizadeh et al., 2018a), and a response rate ranging from 30-53% for electronic surveys (Bardos et al., 2015; Greil, 2018; Tabet, 2019). Considering these response rates, the researcher projected that a minimum of 1,340 individuals needed to be contacted to accommodate the lower response rate of 30%. Considering recruitment occurred through a completely online platform, response rates were calculated through the following: (a) the number of clicks on the survey link compared to the number of completed surveys, (b) the number of clicks to the website link compared to the number of clicks to the survey link, and (c) the number of participants that began the survey but did not complete the survey. Also, due to the current nature of the COVID pandemic, it was expected that the primary method of recruitment would be via an online platform. COVID impeded the accessibility for face to face recruitment and data collection, hence, the research utilized a completely online recruitment plan.  

**Face to Face Recruitment.** The investigation utilized convenience and snowball sampling for community face-to-face recruitment, depending on accessibility due to the COVID pandemic. The following locations were identified as potential locations the sample could be accessed: (a) CLIMB Wellness & Counseling, (b) Perinatal Wellness and Psychological Services, (c) Solace Counseling, (d) Pinnacle Counseling Institute, (e) The Brave Ones Therapy Center, (f) My Fertility Care, and (g) Healing With Wisdom. Face to face recruitment will occur at the following medical locations: (a) Winnie Palmer Hospital, (b) Advent Health for Women, (c) Orlando Health Associates, (d) Center for Reproductive Medicine, (e) Fertility Counseling Orlando, (f), Jenny Joseph, Midwife, (g) Orlando Fertility Clinic, and (h) word of mouth connections from individuals within the tight-knit community of women with infertility. However, due to the impact of COVID, no face-to-face recruitment was implemented.
**Online Recruitment.** In addition to face to face recruitment, convenience and snowball sampling were utilized for online recruitment. Considering online recruitment was the primary method of recruitment, a strong emphasis was placed on online social support groups specifically targeting a diverse population. Several of the online groups and agencies are listed as specifically serving a diverse clientele. The following were locations the sample was accessed remotely: (a) Touchstone Institute, Illinois (b) National Infertility Association (RESOLVE), (c) New Vision Counseling Center, Georgia, (d) RESOLVE support group, (e) Endometriosis Support Group (social media), (f) Infertility support group (social media), and (e) word of mouth connections from individuals within the tight-knit community of women with infertility. Additionally, the researcher developed a website with all study materials, information regarding the purpose of the study, and resources for individuals and couples experiencing infertility. Considering the website had direct access to the survey, participants were informed that their participation in the study was anonymous, for the purpose of increasing participation regarding a sensitive topic.

**Procedures**

Prior to engaging in participant recruitment and data collection, the researcher obtained approval from the Institutional Review Board (IRB) at the University of Central Florida. The IRB approval included (a) all participant recruitment methods (email recruitment, flyers, digital flyers, and website), (b) the exempt research protocol (HRP-255), (c) the informed consent document, (d) the demographic questionnaire, and (e) all measures that will be given to participants (FertiQol, CSI, CD-RISC, PROMIS, FSCR). Risk to participants was minimal, according to the Institutional Review Board (IRB) at the University of Central Florida, seeing as all information was maintained anonymously, participants reserved the right to refuse completing the questionnaires, and survey research does not increase the probability of physical or
psychological harm. Also, all data collected was de-identified and therefore anonymous, protecting participant confidentiality.

**Data Collection**

Upon approval from the International Review Board, the researcher distributed the assessments online, using Qualtrics and the recruitment website. The survey packet included the following: (a) informed consent; (b) general demographic form; and (c) assessment instruments (FertiQol, CSI, CD-RISC, PROMIS, and FSCRS) with items designated as forced response. The researcher provided an incentive of making a $1 donation per individual participant to a infertility research and advocacy group. Participants selected one of the following three organizations: (a) RESOLVE: The National Infertility Association, RESOLVE is a non-profit, 501(c)(3) dedicated to providing access to infertility services, legislative advocacy, education, and community support to individuals with infertility (RESOLVE: The National Infertility Organization, 2020), (b) the Cade Foundation dedicated to providing financial support to couples seeking infertility treatment, and (c) ASRM: American Society for Reproductive Medicine, dedicated to researching infertility and providing support to couples. For participants that were able to complete the survey in conjunction with their partner, surveys were anonymously linked by the participants entering the numerical digits of their street address plus the first letter of the city in which they met their partner. Should the partners live separately, they were asked to enter in the information for the address of the female partner or primary partner with infertility.
Instruments

The constructs examined in this study were measured by the following instruments. Construct reliability and each individual scale’s psychometric properties, including construct validity, are provided.

General Demographic Questionnaire

A general demographic questionnaire was utilized to collect relevant data from the participants for this current study. Demographic information allowed the researcher to know if the sample is an accurate representation of the targeted population (Salkind, 2010). The relevant items included the following: (a) age, (b) gender (c) race, (d) ethnicity, (d) education, (e) household income, (f) rural or urban living, (g) employment status, (h) geographic location, (i) relationship status, (j) impact of infertility on relationship status (k) length of relationship, (l) length of time experiencing self-identified infertility, (m) type of infertility, (n) cause of infertility, (o) if the couple has sought professional help for their relationship (mental health, marriage and family, psychology), (p) if the couple has sought medical help for infertility (see Appendix B), (q) selection of organization to receive $1 donation. Also, the questionnaire had three scale items that included rating access to care, rating overall stress level, and rating the importance of faith or spirituality.

Fertility Quality of Life Tool (FertiQol)

The FertiQol is a 26-item scale that measures fertility related quality of life in participants experiencing infertility (Boivin et al., 2011). The scale is successfully translated into many languages and is considered an international measure. The FertiQol includes 2 introductory items and 24 Likert-type items (5-point) ranging from 0 (very poor) to 4 (very good) within four subscales, (a) impact on emotions (e.g. causes sadness, resentment, grief) (6-items) with a strong
internal consistency of $\alpha = .90$; (b) impact on mind-body (e.g. fatigue, pain, concentration, disrupted daily activities) (6-items) with a good internal consistency of $\alpha = .84$; (c) relational impact (e.g. sexuality, communication and commitment) (6-items) with a good internal consistency of $\alpha = .80$; and (d) social impact (e.g. social inclusion, expectations, and support) (6-items) with an acceptable internal consistency of $\alpha = .75$ (Boivin et al., 2011). Overall, the total scale items demonstrated a strong internal consistency of $\alpha = .92$ (Boivin, Takefman, & Braverman, 2011).

**Couple Satisfaction Index (CSI)**

The CSI is a 16-item scale to measure satisfaction in a couple relationship (Funk & Rogge, 2007). The scale includes 16 Likert scale items (6-point) ranging from 0 (always disagree) to 5 (always agree) all measuring satisfaction in the relationship (Funk & Rogge, 2007). The CSI scores demonstrate positive psychometric properties with a strong internal consistency of $\alpha = .94$, strong validity evidenced by convergent validity with other relationship satisfaction measures such as the Dyadic Adjustment Scale and the Martial Adjustment Test (Funk & Rogge, 2007).

**Connor–Davidson Resilience Scale (CD-RISC)**

The CD-RISC is a 10-item scale measuring an individual’s ability to adapt when faced with adversity (Campbell-Sills & Stein, 2007). The CD-RISC includes 10 Likert-type items (5-point) ranging from 0 (not true at all) to 4 (true nearly all the time). The CD-RISC scores demonstrate positive psychometric properties with a very good internal consistency of $\alpha = .86$ and supported construct validity (Campbell-Sills & Stein, 2007).
**PROMIS Depression Instrument**

The PROMIS Depression Instrument is an 8-item scale measuring an individual’s level of depression in the past seven days (Cella et al., 2010). For the purpose of this current study, the form will be adapted to ask the participants to think back to infertility challenges. The PROMIS Depression Instrument includes 8 Likert-type items (5-point) ranging from 1 (never) to 5 (always). The PROMIS Depression scores demonstrate strong internal consistency of $\alpha = .98$ and evidence of construct validity (Cella et al., 2010).

**The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale (FSCRS)**

The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale is a 22-item, three factor, scale measuring self-reported feelings of internal shame, such as self-hatred and feelings of inadequacy, as well as the ability to self-reassure (Gilbert et al, 2004). The FSCRS is a Likert-type scale (5-point) ranging from 0 (Not At All Like Me) to 4 (Extremely Like Me), with three factors, (a) Inadequate Self with a strong internal consistency of $\alpha = .90$, (b) Hated Self with a good internal consistency of $\alpha = .86$, and (c) Reassured Self with a strong internal consistency of $\alpha = .86$ (Gilbert et al, 2004). Additionally, construct validity was established (Gilbert et al, 2004).

**Socially Desirable Response Set Five-Item Survey (SDRS-5)**

The Socially Desirable Response Set Five-Item Survey is a unidimensional scale measuring self-reported feelings of attitudes and feelings related to acceptance from others (Hays et al., 1989). The SDRS-5 is a Likert-type scale (5-point) ranging from 1 (Definitely True) to 5 (Definitely False). Overall, the total score has a questionable internal consistency of $\alpha = .68$ (Hays et al., 1989), which is comparable to other short form scales measuring social desirability (Reynolds, 1982).
Data Analyses

Analysis of the data included cleaning and screening the data as well as evaluating descriptive statistics through the *Statistical Package for Social Science* (SPSS; Version 25.0). The researcher used *MPLUS* (MPLUS; Version 6.11) to analyze the primary hypothesis of this study using Structural Equation Modeling (SEM; Kline, 2016; Tabachnick & Fidell, 2013) to test the relationships between latent constructs. Next, the researcher used dyadic data analysis (Kenny et al., 2006) to test the Actor-Partner Interdependence Model (APIM; Tabachnick & Fidell, 2013), which allowed the researcher to investigate the effect of infertility on the couple.

**Structural Equation Modeling (SEM)**

Structural Equation Modeling (SEM Kline, 2016; Tabachnick & Fidell, 2013) is a statistical analysis that examines relationships between independent variables (i.e., exogenous) and dependent variables (i.e., endogenous) by creating a structural model. SEM tests specific measurement models to distinguish how groups of observed variables (i.e., manifest variables) define a more abstract construct (i.e., latent variable) while also ascertaining direction and strength of the relationships amid the variables (Kline, 2016). SEM in counseling research requires the following five-step procedure (Crockett, 2012): (a) model specification, (b) model identification, (c) model estimation (e) model testing, and (f) model modification.

The hypothesized structural model presents fertility related quality of life as a predictor for relationship satisfaction, resilience, depression, and shame with gender as a covariate. SEM is an effective statistical analysis when measuring latent constructs and determining the effect of one construct on other latent constructs. For this current study, the manifest observable variables used to measure each latent construct consisted of both total scores and subscale scores, depending on the factor structure of the instrument. Manifest variables measured by total score
 corresponded with instruments with unidimensional factor structure, and manifest variables measured by subscale score corresponded with instruments with multiple factor structure. The following are each latent variables and their corresponding manifest variables (fertility related quality of life [emotions, mind-body, relational, and social sub-scales scores], relationship satisfaction [CSI total score], resilience [CD-RISC total score], depression [PROMIS total score], and shame [inadequate self, hated self, and reassured self sub-scales scores].

**Actor Partner Interdependence Model (APIM)**

The Actor-Partner Interdependence Model (APIM; Kenny et al., 2006) is a model of dyadic data analysis that assesses the interpersonal influence of one partner on the other partner (Kenny et al., 2006). APIM can allow the researcher to account for the influence that one partner’s independent variable has on their own dependent variable (i.e., actor effect) as well as their partner’s dependent variable (i.e., partner effect) (Kenny et al., 2006). For this particular study, the influence on the partners’ scores within each dyadic couple will be assessed to measure how one partner’s fertility related quality of life, relationship satisfaction, feelings of internalized shame, and level of resilience can influence the scores of the other partner. The researcher will use APIM to assess the relationship between the couples with the aforementioned latent variables.

**Distinguishability**

In APIM, the researcher determined if there was distinguishability in the dyads, which means that the members in the dyad have some level of difference between them that can be measured (e.g., gender) (Kenny et al., 2006). However, for this particular study, the dyads were deemed indistinguishable due to the presence of same sex couples, which is accounted for during the SEM analysis.
Ethical Considerations

Ethical considerations of importance were reviewed by the institutional review board (IRB) and the researcher’s dissertation committee. Additionally, due to the sensitive nature of infertility, significant consideration was given to confidentiality. Also, considering that shame is a prominent factor amongst individuals with infertility (Ceballo et al., 2015), the researcher upheld the following ethical considerations:

1. Anonymity and confidentiality of participant information and data collected.
2. Participation in the study was voluntary.
3. The researcher informed participants of their rights through informed consent (upon IRB approval). Due to participation being voluntary, participants could withdrawal from the study without any consequence.
4. The researcher provided participants with their contact information to address any questions or concerns related to the study.
5. The researcher received permission to use the instruments in this study as well as to alter them to reflect sensitive language pertinent to the participant population and transfer them to an online format (i.e., Qualtrics).

The researcher sought permission and approval to conduct this study from the dissertation chair, committee members, and the IRB at the University of Central Florida.

Limitations

The current study had several limitations. Primarily, correlational studies cannot confirm causality (Kline, 2016; Tabachnick & Fidell, 2013), which is a desired determination in research. Also, the present study relied on self-report of the participants, which inherently could impact the results as self-report measures are not entirely reliable due to bias (Dillman et al., 2014). Hence,
the researched included a Socially Desirable Response Set Five-Item Survey (SDRS-5; Hays et al., 1989) to assess for the impact of social desirability. Moreover, considering the couple results were assessed dyadically, and the topic of infertility is a sensitive topic with potentially high rates of stigma (Ceballo et al., 2015), self-report bias may be even more present when considering social desirability. Also, considering the constructs being measured are abstract, emotional experiences, the researcher was unable to control for confounding variables. Since causality cannot be determined, the researcher is unable to fully control for threats to validity (Kline, 2016) (see Chapter 3). Moreover, although reliability and validity can be estimated via the instruments’ psychometric properties, construct validity of the hypothesized model cannot be established until after the measurement model is created and the researcher can deduce if the model accurately represents the measured constructs (Kline, 2016). Furthermore, to mitigate threats of validity, the researcher tested each instrument’s measurement model individually to assess the model’s fit to the data (Kline, 2011). Lastly, considering this study is a novel investigation in the counseling field, generalizability may be limited. Although these limitations are common for correlational survey research, the researcher proactively prepared for all potential threats to internal and external validity.
Chapter One Summary

Chapter one contained the current study to investigate the associations between fertility-related quality of life, relationship satisfaction, resilience, depression, and shame in couples with infertility. Also, in this chapter the researcher introduced the constructs of interest in this research investigation (i.e., fertility related quality of life, relationship satisfaction, resilience, depression, and shame), the statement of the problem, theoretical foundation, purpose, hypothesis and research questions, and significance. Additionally, the researcher presented the methods for the current investigation, including the research design, population and sampling, data collection procedures, instrumentation, and dyadic data analysis plan. Moreover, dyadic research is ideal when examining actor and partner effects amongst constructs within a couple. Lastly, the chapter introduced ethical considerations and study limitations for the current investigation.
CHAPTER TWO: REVIEW OF THE LITERATURE

In chapter two, the researcher reviews the following eight major areas of theory and research: (a) infertility, (b) Theory of Dyadic Coping, (c) the Biopsychosocial Theory of Infertility, (d) fertility related quality of life, (e) relationship satisfaction, (f) resilience, (g) depression, and (h) shame. First, the chapter begins with a discussion of the context for the topic and the population: the experience and prevalence of infertility, couples with infertility, and limitations in current research. Next, the theoretical framework, the Biopsychosocial Theory of Infertility and the theory of Dyadic Coping, is reviewed. Then, an overview of the primary constructs, fertility related quality of life, relationship satisfaction, resilience, depression and shame, and relevant research related to each is provided. Finally, the chapter concludes with a summary of the relationships between the constructs to substantiate the purpose of the present investigation.

Infertility

Infertility is defined as twelve months or longer of unprotected sex without becoming pregnant for women of ages 20–34 years, or six months or longer of unprotected sex without becoming pregnant for women ages 35 years and older (American Society for Reproductive Medicine, 2013). Infertility effects nearly 12-15% of couples and is associated with greater levels of personal and relational distress. Furthermore, the prevalence of infertility has remained steady in the last ten years (Wamser-Nanney, 2019), consistently effecting physical health and influencing mental health; hence, infertility is an important public health concern. As a public health concern, infertility impacts the individual on a biological, relational, and psychological level (Gerrity, 2001), which causes continued emotional and physical distress for the individual in multiple domains for a long period of time. Prolonged exposure to distress can have
detrimental mental health impacts on the individual, such as Post-Traumatic Stress Disorder (Wamser-Nanney, 2019). Furthermore, infertility effects more than just the individual, as it also effects couples and their relationship (Maroufizadeh et al., 2018; Moura-Ramos et al., 2016; Ying & Loke, 2016). In fact, the World Health Organization has suggested that couples are not receiving necessary support, especially in marginalized communities (Burns & Covington, 2006).

**Infertility and Couples**

Couples facing infertility are especially vulnerable to relationship dissatisfaction and heightened levels of anxiety, depression, post-traumatic stress, and shame (Ceballo et al., 2015; Facchin et al., 2019). Furthermore, women tend to not share their infertility distress with their partner, increasing feelings of shame, and decreasing the feeling of support from their partner (Ceballo et al., 2015).

Peterson, Newton and Rosen (2003) conducted a descriptive, correlational study to investigate the relationship between couple congruence in perceived infertility distress (Fertility problem inventory [FPI]; Newton, Sherrard, & Glavac, 1999), depression (Beck Depression Inventory [BD]; Beck et al., 1979) and relationship satisfaction (Dyadic Adjustment Scale [DAS]; Spanier, 1976) in adult couples (N = 525). Couple congruence was defined as the couple feeling a sense of agreement and togetherness in facing the experience of infertility. Participants (female, n = 525; male, n = 525) were recruited from a teaching hospital and met the criteria of primary infertility, meaning that they did not have any children prior to participating in the study. Participants completed the assessments three months prior to beginning any infertility treatment and reported on their age (male, M = 33.8 years; female, M = 32.3 years), length of marriage (M
= 7.1 years), and length of infertility (M = 3.5 years). Data analysis included the researchers creating a dyadic variable to be able to measure score difference within each couple.

Results from the between groups t-tests indicated that females experienced greater levels of depression (t = 9.2, p < .01) and infertility distress (t = 12.4, p < .01). Also, results from the bivariate correlations indicated that there was a strong relationship between marital satisfaction scores and couple incongruence for both men and women on all the subscales related to infertility distress (social concern [men, r = -.14, p < .01, women, r = .18, p < .01]; sexual concern [men, r = -.21, p < .01, women, r = .24, p < .01]; relational concern [men, r = -.22, p < .01, women, r = .28, p < .01]; rejection of being childfree [men, r = -.10, p < .01, women, r = .12, p < .01]; need for parenthood [men, r = -.12, p < .01, women, r = .14, p < .01]; and global stress [men, r = -.15, p < .01, women, r = .21, p < .01]). Hence, researchers found that couples who lack cohesiveness in their perception of the infertility distress tend to have heightened distress in their couple relationship (Peterson, Newton & Rosen, 2003). However, couples who approached infertility in a cohesive way, meaning that they agreed on their infertility experience, tended to experience greater relationship satisfaction. Hence, if the couple shared the emotional experience of infertility, communicated distress, and experienced cohesion in their perception of infertility, they experienced less infertility distress (Peterson et al., 2003).

Couples facing infertility experience a new set of stressors that other couples may not encounter. According to James and Singh (2018), who conducted a qualitative analysis with six couples with infertility, couples that continue to attempt to become pregnant and are unsuccessful, experience a continuous sense of loss, which contributes to lower quality of life and depression. The results of the content analysis highlighted that grief was experienced by all couples in both the men and women. Hence, these results support that couples with infertility
experience unique stressors related to the infertility, such as continuous loss of a hoped for future.

**Limitations in Existing Research**

In the last ten years, there has been a scarce amount of research articles published in counseling journals that investigate infertility within the context of the couple relationship. In fact, Chen et al. (2020) conducted a systematic literature review investigating the prevalence of infertility related articles in twelve different counseling journals between 2000 and 2016. Of the total articles found amongst these journals ($K = 7,890$), only nineteen were related to the topic of infertility (0.24%). Of these related articles, twelve were empirical (63.2%), four were conceptual (21.1%), and three were literature reviews (15.8%). Hence, there is need for infertility related articles in the counseling field. Most of the literature on infertility is found in other disciplines, including but not limited to Nursing and Medicine (Boivin & Gameiro, 2015; Cousineau et al., 2003; Martins et al. 2013; Paul et al., 2010; Roudsari & Bidgoli, 2016; Ussher & Perz, 2019), Psychiatry (Yu et al., 2013), Psychology (Burns & Covington, 2006; Ceballo, Graham, & Hart, 2015), and Health Psychology (Facchin et al., 2019; Lykeridou et al., 2009; Moura-Ramos et al., 2016). More specifically, most research that addresses dyadic data analysis amongst couples experiencing infertility has occurred mainly in other countries (Benyamini et al., 2009; Donarelli et al., 2016; Kroemeke & Kubicka, 2017; Maroufizadeh et al., 2018a). Hence, counseling literature is in need of novel research on how infertility effects the couple to better prepare counseling in their work with couples who may be experiencing infertility (Martins et al., 2014; Peters et al., 2011; Shreffler et al., 2017).
Theoretical Foundation

The Biopsychosocial Theory of Infertility and the theory of Dyadic Coping complement each other well as the former explains the complex experience the individual faces when addressing infertility and the latter explains how the experience of infertility impacts the couple relationship. Infertility effects the biological, psychological, and relational domains considering the individual experiences a physical chronic ailment, which can increase symptoms of depression and shame, thus impacting their relationship with their partner (Ceballo et al., 2015). Furthermore, infertility is not a solitary experience, as couples must endure the infertility distress together considering that there is male infertility, female infertility, combination infertility, and unknown causes (Shreffler et al., 2017). Hence, the theory of Dyadic Coping supports this investigation on the impact of infertility in couples, as each partner’s experience can influence their own levels of distress and coping as well as their partner’s level of distress and coping.

Biopsychosocial Theory of Infertility

The Biopsychosocial Theory of Infertility (Gerrity, 2001) conceptualizes the experience of infertility on the biological, psychological, and relational aspects of an individual. The Biopsychosocial Theory of Infertility is a combination of the traditional biopsychosocial model, with the inclusion of the theory of stress and coping specifically with infertility (Gerrity, 2001). The theory highlights that infertility is more than a physical condition, in fact, infertility impacts the individual’s level of psychological distress as well as relational distress. Moreover, the theory suggests that infertility distress can be lessened with appropriate support from loved ones and partners. Hence, the theory of Dyadic Coping can support the premise that partners who support each other through the experience of infertility will experience less infertility distress (Chaves, 2019).
Ying and colleagues (2018) conducted a systematic literature review assessing infertility-related articles to determine appropriate theoretical frameworks to conceptualize individuals experiencing infertility. After extensive searching and lack of literature meeting inclusion criteria (couples with infertility), the researchers were unable to find any studies that theoretically supported the nuances of couples experiencing infertility, so they developed their own conceptual framework. The researchers utilized a skeletal framework from the articles they did assess ($K = 70$), which supported the use of the Biopsychosocial Theory of Infertility. However, this standalone theory did not account for the complexities of the couple experience. Hence, the researchers combined the Biopsychosocial Theory of Infertility with the theory of Dyadic Coping to account for the couple experience, which provided a preliminary framework for conceptualizing couples with infertility.

**Theory of Dyadic Coping**

The theory of Dyadic Coping presents a process where partners communicate their stress to each other, either verbally or non-verbally, and then address the stressful event together through various ways of coping (Bodenmann, 1995; Kayser & Bodenmann, 2005). Interdependence of the partners is a foundational principle in Dyadic Coping as this theory posits that each partner’s stress prompts their own coping as well as influences their partner’s coping, hence, the goals for the couple is to engage in mutual coping where both partners benefit (Bodenmann, 1995; Kayser & Bodenmann, 2005). As the couple engages in Dyadic Coping, and communicates their stress to each other, both partners can increase in relationship satisfaction (Falconier et al., 2015; Kayser & Bodenmann, 2005). As the couple responds to dyadic stress, and continuously assesses each other’s appraisals, they engage positive Dyadic Coping (Bodenmann, 1995; Kayser & Bodenmann, 2005). Overall, positive Dyadic Coping can
significantly increase relationship satisfaction and decrease individual stress levels, especially in the face of adversity (Bodenmann, 1995; Chaves et al., 2019; Falconier et al., 2015; Kayser & Bodenmann, 2005).

Chaves, Canavarro, and Moura-Ramos (2019) conducted a descriptive, correlational study investigating the role of Dyadic Coping (Dyadic Coping Inventory [DCI]; Bodenmann, 2008) on marital adjustment (Dyadic Adjustment Scale—Revised [RDAS]; Pereira, 2017) and emotional state (Hospital Anxiety and Depression Scale [HADS]; Pais-Ribeiro et al., 2007) in infertile couples (N = 67 dyads) with infertility distress (Fertility Problem Inventory Revised [FPI]; Moura-Ramos et al., 2008). Participants reported on their age (male, M = 34.67 years; female, M = 32.73 years), length of relationship (M = 5.98 years), and duration of infertility (M = 3 years).

Results indicated that there were significant differences within couples regarding dyadic coping as an individual (t = -2.82, p < .01) and dyadic coping by the partner (t = 2.18, p < .05). Also, there were significant correlations between partners regarding the impact of infertility (r = .43, p < .001) and dyadic coping (r = .26, p < .05). The results from the path analysis illustrated that the model was a good fit to the data (χ² = 5.54; CFI = 1.00, RMSEA = 0.00, SRMR = 0.04), which indicated that the impact of infertility on the individual’s own life was negatively related to their perception of dyadic coping in their partner, which was also positively related to their level of marital adjustment. These results suggested that the influence of dyadic coping in the relationship is positively associated with marital adjustment. Limitations of this study included a small sample size, and a lack of controlling for the cause of infertility. However, this study supports the theory of Dyadic Coping as a framework for investigating infertility in couples.
Also, the theory of Dyadic Coping supports the use of the Actor-Partner Interdependence Model when investigating relationships between constructs within couples (Pasch & Sullivan, 2017).

**Dyadic Coping and Relationship Satisfaction.** Falconier and Bodenmann (2015) conducted a meta-analysis with colleagues investigating the association between dyadic coping and relationship satisfaction. The researchers assessed multiple samples \((N = 72)\) and participants \((n = 17,856)\) from across several studies \((K = 57)\). In the meta-analysis, dyadic coping was considered a predictor variable, while relationship satisfaction was considered an outcome variable. Researchers reported on various participant demographics including if the sample was from the United States \((27\%)\), length of relationship \((0-10 \text{ years}, 28\%; 11-20 \text{ years}, 37\%)\), if participants had any medical conditions \((28\%)\), and age \((\text{male}, 69\% < 50 \text{ years}; \text{female}, 72\% < 50 \text{ years})\).

Results from between subgroup \(Q\)-tests indicated that total dyadic coping was a significant predictor of relationship satisfaction \((Q = 65.79, p < .001)\). Also, within partner reports of dyadic coping and across partner reports of dyadic coping both significantly predicted relationship satisfaction \((Q = 50.80, p < .001)\), although within partner reports displayed a strong relationship \((r = .45, p < .001)\). These results suggest that the presence of dyadic coping can predict relationship satisfaction in couples despite various demographic variables. Limitations of this study include the assumption that all studies assessed were methodologically sound and generalizability due to sample demographics. Nevertheless, this study highlights the impact of dyadic coping on overall relationship satisfaction in couples and supports the use of the theory Dyadic Coping in conducting dyadic data analysis.

Herzberg (2013) conducted a descriptive, correlational study investigating the association between dyadic coping (*Dyadic Coping Inventory* [DCI]; Bodenmann, 2008), individual coping
(The Coping Inventory for Stressful Situations [CISS]; Endler & Parker, 1990) and relationship satisfaction (The Relationship Assessment Scale [RAS]; Hendrick, 1988) in couples (N = 240 dyads). Participants (male, n = 240; female, n = 240) were recruited from German university settings (25%) as well as the community (75%) and reported on the following demographic variables: (a) age (male, M = 40.1 years; female, M = 37.6 years), length of relationship (M = 14.5 years), and if they were married (47%) or cohabiting (53%). The researcher utilized Actor-Partner Interdependence modeling for data analysis.

Results indicated that the model fit the data well for both task-oriented coping ($X^2 = 126.81, p < .05$), and emotion-orientated coping ($X^2 = 123.72, p < .001$). Task oriented dyadic coping demonstrated a significant association with relationship satisfaction in both males ($B = .44, p < .001$) and females ($B = .52, p < .001$). Also, there was a significant partner effect of female dyadic coping on male relationship satisfaction ($B = .22, p < .001$). Regarding emotion oriented dyadic coping on relationship satisfaction, there were significant actor effects for both males ($B = .38, p < .01$) and females ($B = .39, p < .01$). Limitations of this study include generalizability as well as the fact that couples in this study demonstrated greater relationship satisfaction. However, this study supports the theory of Dyadic Coping and its effects on relationship satisfaction.

**Fertility Related Quality of Life**

Quality of life, for this particular study, is determined by the impact of fertility problems on the individual’s perceived quality of life. Quality of life is measured by the impact of fertility problems on emotional, mind-body, relational, and social aspects of an individual’s life (Boivin, Takefman, & Braverman, 2011). A national study conducted by the Pew Research Center (2018) examined the main areas of meaning-making that contribute to overall life satisfaction in adults
(N = 4,492) in the U.S. Assessment included thirty topics that previous research has indicated contribute to life satisfaction, however, only four categories were universally designated. Results indicated that regardless of demographic factors, the four main topics that contribute to overall life satisfaction by being rated on a scale from 0 to 10, include: (a) individual health (M = 7.3), (b) romantic relationship (M = 7.2), (c) social support through friendship (M = 7.1), and (d) career (M = 7.1). Furthermore, participants rated their overall quality of life satisfaction on a scale from 0 to 10 (M = 6.7). The highest rated category of good health indicated that Americans who experience good physical health also experience 11% greater life satisfaction than others. Also, individuals that rated their relationship quality with their partner higher, scored 9% higher on rating their overall life satisfaction. Hence, this study highlights two important factors that contribute to overall quality of life, good health and relationship satisfaction. Moreover, the results of this study suggest that individuals who struggle with their health will experience lower quality of life.

Quality of Life and Health

Litzelman and colleagues (2016) conducted a descriptive, correlational study using dyadic multilevel modeling and an Actor Partner Interdependence model to investigate couples’ dyadic effect on quality of life (Short Form-12 [SF-12]; Ware, Kosinski, & Keller SD, 1996) and depression (Patient Health Questionnaire [PHQ-2]; Kroenke, Spitzer, & Williams, 2003) in couples with and without a cancer diagnosis (N = 1,820). The participants consisted of four different dyadic groups: (a) the husband had cancer related health problems (HC, n = 483), (b) HC comparison group without cancer related health problems (n = 483), (c) the wife had cancer related health problems (WC, n = 427), and (d) WC comparison group without cancer related health problems (n = 427). Participant data was collected through the Medical Expenditures
Panel Survey (MEPS) and the demographic variables of age (HC, $M = 65$ years; WC, $M = 57$ years), gender, and ethnicity were recorded for each group of dyads.

Results related to between groups analysis indicated that overall the HC dyads had more cancer related health complaints and worse health related quality of life compared to the WC dyads. Also, results indicated that the HC group demonstrated a significant partner effect on quality of life (husband, $\beta = 1.11$, $p < 0.01$; wife, $\beta = 1.21$, $p < 0.01$), both mental and physical, and depression (husband, $\beta = -2.36$, $p < .05$; wife, $\beta = -4.29$, $p < 0.01$) compared to no partner effect in the comparison groups. Also, the WC group demonstrated a significant partner effect on quality of life (husband, $\beta = 0.83$, $p < 0.05$; wife, $\beta = 1.03$, $p < 0.01$), both mental and physical, and depression (husband, $\beta = -3.49$, $p < .05$; wife, $\beta = -1.89$, $p < 0.10$) compared to no partner effect in the comparison groups. The results indicate that couples where one partner experiences cancer related health complaints are more likely to influence each other’s quality of life and depression as compared to couples who do not exhibit health complaints. The limitations of this study included: (a) a lack of information in type of cancer or severity of diagnosis, (b) a lack of clarity on how the missing data removed may have altered the results, considering the dyads that were missing data had significantly worse scores, (c) the brief nature of the assessments making them non-clinical, and (d) the age and length of marriage of participants may have operated as a confounding variable. Nevertheless, this study supports the need to further investigate the relationship between chronic health conditions and quality of life in couples.
Quality of Life and Shame

Wood, Barden, Terk, and Cesaretti (2017) conducted a descriptive, correlational study with dyadic data analysis investigating the relationship between stigma (Social Impact Scale [SIS]; Fife, Wright, & Wright, 2000), quality of life (Functional Assessment of Cancer Therapy with Prostate Cancer [FACT-P]; Esper et al, 1997; Functional Assessment of Cancer Therapy – General Population [FACTGP]; Cella et al., 1993), and relationship satisfaction (Couples Satisfaction Index [CSI]; Funk & Rogge, 2007) in couples (N = 80 dyads) where one partner survived prostate cancer (PC). The SIS had a subscale that specifically measured internalized shame ($\alpha = 0.72$) as research on stigma tends to include shame. Participants were grouped in dyads as PC survivors and their partners. Researchers reported that the majority of participants identified as White (80%) and married (96.3%). Also, a majority of participants received some form of treatment for the prostate cancer (92.5%). The researchers used structural equation model as their method of data analysis.

Results indicated that there was a significant negative relationship between stigma and quality of life for both survivors ($r = -0.29, p < .01$) and their partners ($r = -0.42, p < .01$). Overall, the path analysis indicated that there was a significant association between stigma and quality of life ($\beta = -0.7, p < .05$), which stigma accounting for 48% of the variance in quality of life scores. Additionally, when further examining the role of stigma, the researchers discovered that self-stigma, referring to one’s own stigma that becomes a part of their identity, was a greater predictor of overall stigma ($R^2 = 0.58, p < 0.05$). Limitations of this study included a lack of sample diversity and a lack of assessing partner stigma in addition to survivor stigma. Although this study specifically assessed stigma, which is arguably different from shame, the measurement used indicates that internalized shame is an important factor in assessing for stigma. Also, this
study supports the association of shame and lower levels of quality of life. Hence, this study supports the need to further investigate the effect of internalized shame on quality of life in couples facing chronic health conditions, such as infertility.

**Fertility Related Quality of Life**

Kitchen and colleagues (2017) conducted a meta-analysis investigating female fertility related quality of life and patient report outcome measures. The literature search identified several citations ($K = 4,361$), which were then narrowed down to relevant quality of life studies ($k = 115$). After reviewing the relevant studies, there were six primary patient report outcome measures: (a) Fertility Quality of Life (FertiQoL), (b) Fertility Problem Inventory (FPI), (c) Fertility Problem Stress (FPS), (d) Infertility Questionnaire (IFQ), (e) Illness Cognitions, and (f) Questionnaire Adapted for infertility (ICQ-I). Through analysis of each study, the authors did not report specific scores to suggest internal reliability and construct validity, rather they reported as acceptable or not.

Results indicated that the FertiQoL was the mostly widely used measure to assess quality of life related to infertility. The measure indicated acceptable reliability and content validity. Additionally, the FertiQoL properly evaluated infertility problems and infertility related distress similarly to the FPI. Hence, the FertiQoL can accurately measure infertility related quality of life as a result of infertility related distress. The primary limitation of this review included the fact that only one research assistant conducted the first round of searching. However, this review of the literature highlights the FertiQoL’s effectiveness in assessing fertility related quality of life. Furthermore, this review supports the need to assess fertility related quality of life in couples with infertility.
Zurlo (2018) conducted a descriptive, correlational study to investigate the predictors of quality of life (*Fertility Quality of Life Questionnaire* [FertiQoL]; Boivin, Takefman, & Braverman, 2011) and mental health (*State-Trait Anxiety Inventory* [STAI-Y]; Spielberger, 1972; *Edinburgh Depression Scale* [EDS]; Murray, & Cox 1990; *Dyadic Adjustment Scale* [DAS]; Spanier, 1976) in couples with infertility (*N* = 412) in regard to length of infertility. The participants’ (male, *n* = 216; female, *n* = 206) age (*M* = 34 years), education level (36.9% college), duration of infertility (*M* = 3 years; 24.5% > 3 years), and marital status (93.4% married) was collected.

Results indicated significant gender differences related to fertility quality of life with females demonstrating lower quality of life (male, *M* = 55.15; female, *M* = 52.66, *p* < .05). Logistic regression analysis revealed the primary finding, which was that a greater duration of infertility (> 3 years) revealed significantly lower quality of life in men (β = .61, *p* < 0.01) and women (β = .42, *p* < 0.01), increased depression in men (β = 4.56, *p* < 0.01) and women (β = 5.61, *p* < 0.01), and increased anxiety in men (β = 3.25, *p* < 0.01) and women (β = 4.51, *p* < 0.01). Also, high perceived dyadic adjustment scores were associate with greater levels of quality of life in both men (β = 3.52, *p* < 0.01) and women (β = 4.58, *p* < 0.01). Limitations of the study include a small number of demographic variables collected, and lack of a more sophisticated investigation in to the couple’s perceived dyadic adjustment. Hence, it would be valuable to assess each couple’s fertility related quality life as a dyadic unit through APIM.

Huppelschoten and colleagues (2013) conducted a cross-sectional study investigating the differences in quality of life (*Fertility Related Quality of Life* [FertiQoL]; Boivin et al., 2011) and emotional adjustment (SCREENIVF; Verhaak et al., 2010) between women (*n* = 696) with infertility and their partners (*n* = 520). Participants (*N* = 1216) reported their age (partners, *M* =
35 years; female, $M = 33$), length of relationship ($M = 9.4$ years), Dutch background (partners, $M = 91.3$; female, $M = 86.8$), and duration of infertility ($M = 2.8$ years). Researchers compared quality of life scores and emotional adjustment scores between the group of women and the group of partners to detect overall differences.

Results indicated significant differences between women and their partners on several domains of both quality of life and emotional adjustment. Results indicated a significant difference between women and their partners for overall quality of life (female, $M = 70.8$; partners, $M = 80.2$, $p < .01$), FertiQoL emotional subscale (female, $M = 52.5$; partners, $M = 79.2$, $p < .01$), FertiQoL mind-body subscale (female, $M = 66.7$; partners, $M = 83.3$, $p < .01$), and FertiQoL social subscale (female, $M = 75$; partners, $M = 83.3$, $p < .01$), meaning that women had significantly lower scores associated to fertility related quality of life. Also, results indicated a significant difference between women and their partners for emotional adjustment related to anxiety (female, 27.4%; partners, 11.1%, $p < .01$), depression (female, 9.9%; partners, 5.3%, $p < .01$), helplessness regarding infertility (female, 34.2%; partners, 12.6%, $p < .01$), and lack of acceptance regarding infertility (female, 31.2%; partners, 12.8%, $p < .01$), meaning that women displayed significantly more depression, anxiety, and helplessness than their partners related to their infertility. A limitation of the study included the lower response rates of partners, which although the researchers adjusted for lack of responses, could still impact the findings. Also, the study only compared total scores between two groups rather than comparing each individual couple. Nevertheless, considering the significant group differences, this study supports the need for further investigation into fertility related quality of life in couples through dyadic analysis.
Kim and colleagues (2018) conducted a descriptive, correlational study investigating the relationship between fertility related quality of life (Fertility Related Quality of Life [FertiQoL]; Boivin et al., 2011) infertility distress (Fertility Problem Inventory [FPI]; Newton et al., 1999), marital adjustment (Revised Dyadic Adjustment Scale [RDAS]; Spanier, 1976), and depression (Beck Depression Inventory [BDI]; Beck, 1967) in Korean infertile couples (N = 121 dyads). Participants (male, n = 121; female, n = 121) reported their age (men > 35 years, 66.9%; women > 35 years, 48.8%), length of infertility treatment (> 2 years, 84.3%), and if the wives (84.3%) or husbands (94.2%) felt the financial burden of infertility. The researchers utilized Actor-Partner Interdependence modeling for their data analysis.

Results indicated that there were significant gender difference in quality of life (t = 7.24, p < .001), infertility distress (t = -3.61, p < .001), and depression (t = -6.83, p < .001), considering wives experienced lower quality of life, greater infertility distress, and greater depression. Results from the APIM indicated that infertility stress in the wives had an actor effect on their own quality of life (β = -.46, p < .001) and a partner effect on the husband’s quality of life (β = -.38, p < .001), meaning that as the wives experienced greater infertility distress, both her and her husband would experience lower quality of life. Also, the wives experienced an actor effect of marital adjustment on their own quality of life (β = .31, p < .01), suggesting that the greater the marital adjustment the greater the quality of life. Additionally, there was an actor effect (β = -.56, p < .001) and partner effect (β = -.39, p < .01) of the wives’ level of depression on quality of life, meaning that greater levels of depression were indicative of lower levels of quality of life. Husbands displayed an actor effect of depression on their own quality of life (β = -.21, p < .05). A limitation of this study includes generalizability to other
populations due to the sample being Korean and actively seeking infertility treatment. Also, the authors did not report on correlations amongst constructs. However, this study supports further investigation focused on the complex interconnection of fertility related quality of life, relationship satisfaction and depression in other populations. Also, this study supports that infertility distress strongly impacts fertility related quality of life, suggesting that when measuring fertility related quality of life, the impact of the individual’s infertility distress on their overall wellbeing is appropriately captured.

**Relationship Satisfaction**

One in five individuals rate their romantic partner as someone who significantly impacts their meaning and satisfaction in life (Pew Research Center, 2019). A national study conducted by the Pew Research Center (2019) surveyed Americans to examine relationship satisfaction in adults (N = 4,927). Results indicated that adults experience greater levels of relationship satisfaction in the following facets of their relationship: (a) parenting, (b) chores, (c) work and personal life balance, (d) communication, and (e) sexual satisfaction. Additionally, trust was assessed as an integral component of relationship satisfaction and found to be more prevalent amongst married couples. Trust was calculated by scores on the following domains: (a) faithfulness, (b) acting in the partner’s best interest, (c) telling the truth, and (d) financial responsibility. The results of this study highlight the benefit of relationship satisfaction as well as the various domains in which couples can facilitate greater satisfaction.

The National Survey of Married Couples (Olson et al., 2008) surveyed adult Americans (N = 50,379) to examine happiness and marital satisfaction (*ENRICH Couple Inventory*; Fowers & Olson, 1989). The participants (N = 50,379) were divided in to two groups, consisting of happily married couples (n = 20,675) and unhappy couples (n = 20,590), and represented all
fifty states. Participant demographics regarding children included, no children (29%), one to two children (48%), and three or more children (27%). Additionally, participants identified themselves as Caucasian (84%), African American (5%), Hispanic (5%), Other (3%), Asian-American (2%), and mixed ethnicity (2%).

Results indicated specific characteristics that distinguish between happily married couples and unhappily married couples as derived from the scores on the ENRICH couple inventory. Results indicated that the five characteristics that can predict happily married couples include: (a) communication (95%), (b) closeness (93%), (c) flexibility (83%), (d) personality (88%), and (e) conflict resolution (78%). The five categories that revealed relationship issues for unhappily married couples included disagreement in the following areas: (a) parenting (81%), (b) personality (77.5%), (c) conflict (76.5%), (d) communication (76%), and (e) leisure activities (75%). Overall, happily married couples were distinguished as prioritizing communication, closeness, and flexibility as opposed to unhappily married couples who shared that they strongly desired for their partner to emotionally express themselves (76%). Hence, relationship quality can be attributed to positive communication, emotional closeness, and effort towards conflict resolution.

Relationships and Health

Relationship satisfaction has been found to have direct connections with physical health and chronic pain (Notari et al., 2017). Specifically, individuals in cohesive and secure relationships experience significant positive benefits when faced with the adversity of a health crisis compared to couples who are in fragmented relationships (Peterson, Newton & Rosen, 2003).
Bookwala (2005) conducted a cross-sectional research study utilizing the National Survey of Midlife Development in the United States (MIDUS) to investigate the relationship between marital quality and physical health in adults ($N = 729$). Marital quality was determined by the following five categories of questions: (a) marital disagreement (3 items; $\alpha = .75$), (b) positive behaviors towards partner (6 items; $\alpha = .91$), (c) negative behaviors toward partner (6 items; $\alpha = .87$), (d) quality of relationship (1 item), and (e) communication (4 items; $\alpha = .88$). The following four components measured physical health: (a) physical symptoms (9 items; $\alpha = .71$), (b) chronic health issues (29 items), (c) Physical disability (9 items; $\alpha = .93$), and (d) perceived health (1 item). The researcher also controlled for age, education, gender, and symptoms of depression. Participant demographics included age ($M = 60.5$ years), gender (male, $n = 409$; female, $n = 520$), and race (93.6% white).

Data analysis included bivariate correlations and regression analysis. Results indicated the covariate of depression was highly correlated with lower marital quality ($r = .11$, $p \leq .05$). Regression analysis indicated that negative spousal behavior was a significant predictor of chronic health problems ($\beta = -.11$, $p < .05$), physical disability ($\beta = -.20$, $p < .001$), and lower perceived health ($\beta = .11$, $p < .05$). Overall, after moderating for gender and controlling for covariates, there was no significant impact of gender on marital quality and negative behaviors towards spouse were significantly predictive of physical health. Limitations of this study include: (a) due to the cross-sectional nature, there is the inability to determine causation, meaning it is likely that poorer physical health may also contribute to marital quality, (b) the nature of self-report leaves room for error in self-assessment, (c) a lack of racial diversity in the sample, and (d) the sample mean age may contribute to the increase in physical health issues. However, this study addresses how the negative behaviors between partners can predict poorer health, which
speaks to the need to better understand how couples dyadically cope with health issues such as infertility.

A correlational research study by Gana and Jakubowska (2016) investigated the effects of individual’s ($N = 150$) infertility stress (*Fertility Problem Inventory* [FPI]; Newton et al., 1999) on psychological distress (*The Beck Depression Inventory* [BDI]; Beck et al., 1974; *The State-Trait Anxiety Inventory* [STAI]; Spielberger, 1972) and marital satisfaction (*The Dyadic Adjustment Scale* [DAS]; Spanier, 1976). Additionally, gender and age ($M = 33.27$ years) were assessed as covariates. The participants (male, $n = 78$; female, $n = 72$) were recruited during their initial medical interview at an infertility clinic in France. Also, the participants reported if they were married (41%) or cohabitating (59%) as well as if they were experiencing primary infertility (82%) or secondary infertility (18%).

The researchers conducted structural equation modeling to analyze their data. The results indicated that infertility stress significantly effects psychological distress and marital satisfaction. Particularly, increases in infertility stress contributed to decreases in marital satisfaction in the relationship ($\chi^2 = 303.30, p < .001$). Multiple limitations for this study were noted. The limitations of the study include a lack of generalizability considering this sample was collected from a singular site and from a specific region in France, the inherent limitations of self-report measures (e.g., social desirability) and the lack of assessing partner interactions. Lastly, since relationship satisfaction involves the couple, dyadic analysis would provide more information on the impact of infertility stress on relationship satisfaction. However, this study supports the notion that infertility can negatively impact relationship satisfaction and supports the need for further inquiry utilizing larger, more diverse samples of couples.
Dyadic Analysis

Bodenmann, Pihet, and Kayser (2006) conducted a longitudinal research study where they investigated the relationship between dyadic coping (Dyadic Coping Questionnaire [FDCT-N]; Bodenmann, 2000) and marital quality (Partnership Questionnaire [PFB]; Hahlweg, 1996) in couples ($N = 90$ dyads). The study initially had more participants ($N = 110$ couples); however, considering the longitudinal design, couples dropped out of the study due to moving and separation. The participants (male, $n = 90$; female, $n = 90$) were recruited through newspaper ads in Switzerland and had to have been in a committed relationship for a minimum of one year. The demographic variables of age (male, $M = 42$ years; female, $M = 44$ years), education (male, 38% college graduates; female, 13% college graduates), and income (85% of couples’ income > $50,000) were collected.

Four time points of data collection occurred in the study (initial meeting, 6-month post, 1-year post, and 2-year post); however, the researchers decided to not include time in the results as the time did not affect the analysis. The researchers utilized hierarchical linear modeling to predict marital quality on the level of the individual (i.e., intraindividual) and the partner (i.e., interindivdual). The results indicated that on the individual level, that positive forms of dyadic coping were significantly related to positive marital quality (male, $\beta = 1.982$, $p < 0.001$; female, $\beta = 1.986$, $p < .001$). On the interindivdual level, men’s form of dyadic coping strongly related to the marital quality of both partners, meaning that the men’s positive form of dyadic coping significantly impacted their own scores and their partner’s scores on marital quality ($\beta = .091$, $p < 0.05$). However, the women’s form of positive or negative dyadic coping had no impact on their partner’s marital quality ($\beta = 1.974$, $p > .10$). The researchers concluded that their results were in line with previous findings on relationship quality and that the scores indicated that
men’s dyadic coping have more of an impact on women’s marital quality than women’s dyadic coping. This study had several limitations, including a lack of socioeconomic diversity in the sample, as evidenced by income, the lack of reporting on racial and ethnic diversity, and a small sample size. However, this study invariably provides evidence on how forms of dyadic coping influence relationship quality in couples, which supports the need to include the couple in dyadic analysis.

Furthermore, research has investigated the actor-partner interdependence effects of infertility and relationship satisfaction. Maroufizadeh and colleagues (2018) conducted a cross-sectional research study where they utilized dyadic analysis to investigate the actor and partner effects of marital satisfaction (ENRICH Marital Satisfaction Scale [EMS]; Fowers & Olsen, 1993) on depression (Hospital Anxiety and Depression Scale [HADS]; Zigmond & Snaith, 1983) in couples with infertility (N= 141 dyads). The participants (male, n = 141; female, n = 141) were from an infertility treatment clinic in Iran, during the assessment phase of treatment. Additionally, participants indicated their infertility as primary infertility (72%), meaning the couple has not been able to have any children, or secondary infertility (28%), meaning the couple was able to conceive once.

The researchers utilized Actor-Partner Interdependence Modeling and results indicated two primary findings. First, there was a considerable actor effect of marital satisfaction on depression (male, β = −0.412, p < 0.001; female, β = −0.263, p < .01), meaning that each individual partner’s level of marital satisfaction effected their own level of depression, with higher scores of marital satisfaction predicting lower scores of depression. Second, there was a strong partner effect of men’s marital satisfaction on women’s depression (β = −0.170, p < .05), meaning that men’s level of marital satisfaction significantly impacted women’s depression.
scores. However, results indicated no partner effects on women’s marital satisfaction on men’s depression. This study was the first exploration of dyadic analysis of marital satisfaction and depression on couples with infertility in Iran. Although this study took place in a different country, which limits the generalizability of the findings to the United States, the findings provide evidence through dyadic analysis of how couples with infertility experience marital satisfaction as well as the need to utilize this study design in counseling literature. An additional limitation was the use of a single data collection site. However, this study provides valuable contributions to the understanding of relationship satisfaction in couples with infertility. Also, this study supports the notion that relationship satisfaction and mental health are interrelated, and it is necessary to explore how partner’s experiences interdependently affect each other within the context of infertility.

Greil and Colleagues (2018) conducted a cross-sectional research study investigating the impact of self-identified infertility and relationship satisfaction on infertile couples. The researchers asked participants questions regarding self-identified infertility as well as relationship satisfaction. Self-identified infertility was assigned if the responded answered ‘yes’ to one of two questions regarding their fertility status. Participants responding to five ‘yes’ or ‘no’ questions developed by the researchers measuring relationship satisfaction. The participants (male, n = 425; female, n = 425) were found through the U.S. National Survey of Fertility Barriers and data was collected through telephone interviews. Additionally, the researchers collected data on the participant’s age ($M = 35.74$ years) and status of primary infertility (48%).

The researchers analyzed three separate path models to determine the optimal fit including a model that analyzed each self-identified infertility on relationship satisfaction for each individual partner as well as for the couple. Results indicated that female partners have
significantly lower relationship satisfaction if either partner identifies as having a fertility problem; however, men’s relationship satisfaction was not influenced by self-identifying with a fertility problem. The primary limitation of this study was the limited reliability of the relationship satisfaction questionnaire as the researchers developed their own question and did not use a reliable measure for relationship satisfaction. The researchers suggested that future studies utilize more reliable measures to better determine the path model. Also, this study attempted to assess for effects that one partner has on the other partner’s level of relationship satisfaction through comparing three separate regression models; however, the use of Actor-Partner Independence Modeling could better assess both partners’ influence on each other. This particular study has provided insight into the impact of infertility on the couple relationship. Moreover, this study supports the need for research to continue to examine the nuances of how infertility effects the dyad by investigating how both partners’ response to infertility impacts each other’s level of relationship satisfaction.

Resilience

A national survey between Everyday Health and Ohio State (2019) examined the common traits of resilience (Everyday Health Resilience Assessment; Sood, 2019) amongst individuals eighteen years old and up in the United States (N = 3,538). The participants (male, n = 1,613; female, n = 1,896) were recruited nationally and identified as the following ethnicities: (a) White (n = 2,784), (b) African-American (n = 478), (c) Asian (n = 156), and (d) Multi-racial (n = 131). Also, participants disclosed relationship status as single (33%), married (29%), divorced (10%), second marriage (8%), in a relationship (7%), cohabitating (7%), widowed (3%), and separated (2%).
Results indicated that individuals perceived that physical health most impacted their overall wellness and sense of resilience (89%). Participants with a chronic health condition indicated the following areas of focus to improve their condition: (a) mental health (54%), (b) interpersonal health (44%), (c) physical health (36%), (d) hobbies (29%), and (e) financial health (21%). Interpersonal health was defined as positive feelings towards a relationship. The majority of participants overestimated their perceived level of resilience (83%), whereas only about half actually scored as resilient (57%). Limitations to this study include a lack of racial and ethnic diversity as a majority of the participants identified as White (78%). Also, the researchers did not provide internal reliability measures for the constructed survey; however, they did disclose that the measure displayed strong reliability across multiple control trials. Lastly, there was a lack of advanced data analysis that could assess relationships between variables. Overall, the results of this study indicate that individual’s self-perception of resilience may differ from their actual resilience. Also, the presence of interpersonal health is a key factor of resilience in individuals with chronic health conditions.

**Resilience and Depression**

Sharpley, Bitsika, and Agnew (2020) conducted a descriptive, correlational study investigating the relationship between adults couples’ \( (N = 111) \) resilience (The Connor-Davidson Resilience Scale [CDRISC]; Connor & Davidson, 2003), depression (The Zung Self-Rating Depression Scale [SDS]; Zung, 1965), and dyadic adjustment (Dyadic Adjustment Scale [DAS]; Spanier, 1976). The participants all met the exclusion criteria of being diagnosed with a chronic mental illness. Participants reported on the following demographics: (a) age (\( M = 40 \) years), (b) sex (male, \( n = 41 \); female, \( n = 70 \)), and (c) marital status of single (26.6%), married
(56.6%), separated (15.8%), or widowed (1%). The researchers reported that the sample size met the requirements to determine a medium effect size and conducted linear regression analysis.

Results indicated that there were three main significant relationships found. First, a significant relationship between dyadic adjustment and depression ($B = -.36, p < .001$) was found, which indicates that stronger dyadic adjustment is related to lower depression scores. Second, a significant relationship between dyadic adjustment and the mediator variable of resilience ($B = .46, p < .001$) was found, which indicates that individuals who reported strong dyadic adjustment in their relationships also had greater resilience. Third, resilience statistically significantly predicted depression ($B = -.49, p < .001$) when dyadic adjustment was controlled, meaning that even when the variable of dyadic adjustment is removed, greater resilience can predict lower depression scores. Limitations included a small sample size, as a larger sample size could detect greater power and the lack of a clinical interview to determine severity of depression. Although the researchers assessed for dyadic adjustment in individuals, it would be beneficial to assess the relationship between resilience, depression, and dyadic adjustment if both members of the dyad were included. Nevertheless, this study highlights the relationship between resilience and depression, providing insight into how greater levels of resilience are associated with lower levels of depression.

Dolphin, Steinhardt, and Cance (2015) conducted a descriptive, correlational study investigating the relationship between resilience (Connor-Davidson Resilience Scale [CDRISC]; Connor & Davidson, 2003), depression (Center for Epidemiologic Studies–Depression Scale [CES-D]; Radloff, 1977), coping (Brief Coping Orientations to Problems Experienced Scale [Brief COPE]; Carver, 1997), positive emotions (Positive and Negative Affect Schedule [PANAS]; Watson, Clark, & Tellegen, 1988), and marital satisfaction (single item on a 10-point
Likert scale ranging from 1 [very unsatisfied] to 10 [very satisfied]) in military wives (N = 252) following homecoming, which is viewed as a significant adjustment in the relationship.

Participants consisted of military wives whose husbands were deployed. Participants reported age (M = 25 years) and identified as one of the following ethnicities: Caucasian (66%), Hispanic (17%), African American (13%), Asian (2%), and other (2%). The researchers utilized structural equation modeling for data analysis.

Results indicated that the model of resilience mediating depression fit well (χ² = 49.886, p = .06). There was a direct effect between wives that experienced more positive emotions being associated with greater resilience (B = .19, p < .001) and greater resilience being associated with lower depression (B = -.33, p < .001). Overall, resilience completely mediated positive emotions and depression, as resilience was associated with lower depression. Limitations of the study included the use of the PANAS, as it does not account for affect or emotional experience, also the measure of marital satisfaction was simply a one-item question, which has no reliability. However, the study supports the evident association between resilience and depression. Although the study was conducted with military wives, it is still relevant as it highlights the effects of resilience on depression in the midst of a challenging and stressful live event.

**Resilience and Relationship Satisfaction**

Sanford and colleagues (2017) conducted a descriptive, correlational study investigating the relationship between resilience (Couple Resilience Inventory [CRI]; Sanford et al., 2015), relationship satisfaction (Couples Satisfaction Index [CSI]; Funk & Rogge, 2007), and exposure to traumatic events (11-item list of critical incidents; International Association of Fire Fighters, 2001) on overall well-being (WHO-5 Wellbeing Index [WHO-5]; Bech, 2004) in adult firefighters (N = 102). The CRI measured both positive resilience skills and negative resilience
skills. The participants reported their age \((M = 42.17\) years) and identified as White (79%), Hispanic (9%), African American (2%), Asian (2%), or Other (8%). Also, participants disclosed their gender (male, 87.3%; female, 12.7%) and if they were married (90.2%) or cohabitating (9.8%). The researchers utilized structural equation modeling for data analysis.

Results indicated that there was a strong correlation between level of positive resilience and relationship satisfaction \((r = .35, p < .01)\) meaning that individuals with greater resilience also experience greater relationship satisfaction. Also, there was a strong correlation between negative resilience and relationship satisfaction \((r = -.44, p < .01)\), meaning that individuals who display negative resilience characteristics will experience less relationship satisfaction. Path analysis revealed that relationship satisfaction mediated the effects of positive resilience \((B = .11, p < .05)\) and negative resilience \((B = -.13, p < .05)\) in predicting well-being, meaning that the association between positive or negative resilience and relationship satisfaction predicts well-being. Hence, individuals with positive resilience and high relationship satisfaction will likely experience a greater sense of well-being. Researchers noted that the sample of firefighters displayed lower levels of positive resilience compared to previous studies, which they suggest is due to firefighters not sharing their negative experience with their partners. Interestingly, the lack of sharing with one’s partner about the emotional impact of a negative experience is also found in individuals with infertility (Ceballo et al., 2015). Primary limitations of the study were that all the participants reported on past stressful events rather than present events, also there was a lack of diversity in the sample. Nevertheless, this study supports the need to further investigate the relationship between resilience and relationship satisfaction in individuals and couples, that experience stressful life events.
Resilience and Infertility

Li and colleagues (2019) conducted a cross-sectional survey research study to investigate the moderating role of marital satisfaction (Dyadic Adjustment Scale [DAS-7]; Hunsley et al. 2001) and resilience (Conner-Davidson Resilience Scale [CD-RISC]; Campbell-sills & Stein 2007) on infertility distress (Fertility Problem Inventory [FPI]; Newton et al. 1999) for Chinese women (N = 466). All participants were married and recruited from maternal health hospitals in China. The demographic variables included: (a) age (93% under 40 years), (b) duration of infertility (76% between 2-5 years; 8.5% ≥ 5 years), (c) prior pregnancy loss (no, 51.7%; yes, 31.8%; no response, 16.5%), and (d) education (70% had at least a college degree).

Results indicated that marital satisfaction and resilience were significant moderators for direct and indirect effects of infertility stress on life satisfaction (marital satisfaction, SE = .11, p < .001; resilience, SE = .12, p < .01). Hence, resilience plays a role in how significantly infertility stress impacts overall satisfaction. Limitations of this study include utilizing self-report measures, correlational research design and the fact that this data was collected in China and is not generalizable to the United States population. Furthermore, this study only investigated the effect of resilience on infertility distress in individual women. Considering that the findings support that resilience impacts individual women’s experience of infertility distress, it would be beneficial to consider the couple relationship and how resilience in each partner impacts the other through dyadic analysis.

Sexton, Byrd, and Kluge (2010) conducted an exploratory factor analysis investigating the associations between infertility related distress (Fertility Problem Inventory [FPI]; Newton et al., 1999), general distress (The Symptom Checklist 90-Revised [SCL-90]; Derogatis, 1994), coping behaviors (Ways of Coping Questionnaire [WCQ]; Folkman and Lazarus, 1988),
depression (*Beck-Depression Inventory-Revised* [BDI-II]; Beck et al., 1996) and resilience (*Connor–Davidson Resilience Scale* [CD-RISC]; Connor and Davidson, 2003) in women with infertility (*N* = 40), experiencing treatment from nine different fertility clinics in the United States. The researchers collected the following demographic variables: (a) age (*M* = 33.3), (b) ethnicity (90% Caucasian), (c) marital status (95% married), (d) education (97.5% with some college), and (e) whether or not the infertility was considered primary infertility (75%).

The purpose of this study was to investigate the validity and reliability of the *Connor–Davidson Resilience Scale* (Connor and Davidson, 2003) in relationship to the other constructs, specifically in women with infertility. The results indicated that the CD-RISC was strongly reliable (*α* = .92) when assessing resilience in infertility patients. Also, correlations illustrated that resilience was significantly positively correlated with positive coping (*r* = .277, *p* < .05), negatively correlated with general distress (*r* = -.612, *p* < .001), and negatively correlated with infertility distress (*r* = -.644, *p* < .001), meaning individuals with increased resilience displayed less infertility relates distress. Limitations of this study include: (a) the fertility treatment the participants were receiving may have influenced their scores as receiving treatment was not considered as a confounding variable, and (b) simple bivariate correlations inhibit the researchers from seeing interactions between variables. However, the results from this study support the presence of resilience as an important factor when assessing for infertility distress.

**Resilience in Infertile Couples**

Herrmann and colleagues (2011) conducted a descriptive, correlational study investigating the relationship between resilience (The Resilience Scale [RS]; Wagnild & Young, 1993), quality of life (*The World Health Organization Quality of Life Assessment (short version)* [WHOQOL BREF]; The WHOQOL-Group, 1998), and infertility related distress (*The Fertility
Problem Inventory [FPI]; Newton, Sherrard, & Glavac, 1999) with adult couples (N = 199 dyads) in Germany. The participants (male, n = 199; female, n = 199) disclosed whether their infertility was primary (71%) or secondary (29%), and if the female (37%) or the male (63%) had been diagnosed infertile. Also, the following demographic variables were collected (a), age (male, M = 35.6 years; female, M = 33 years), (b) duration of relationship (range 2-27 years), and (c) length of time desiring children (range 5 months to 14 years).

The results indicated that resilience was positively correlated with quality of life in both males (p < .0001) and females (p < .0001). Also, resilience in women was negatively correlated with infertility distress (p < .0001) meaning that women who experienced high scores in resilience experienced significantly less infertility distress. Implications from the study suggest that resilience may operate as a protective factor against infertility related distress in women and for the couple’s quality of life. There are limitations of this study worth noting. First, the study was conducted in Germany, which limits generalizability. Second, the participants reported a large range in the amount of time they experienced infertility as well as the length of their relationships. Also, although the study utilized correlations to compare between genders, a more sophisticated data analysis, such as APIM, could have allowed the researchers to see how one partner’s resilience scores influence the other partner’s score, which could provide more insight into the relationship of resilience in couples with infertility.

Peters, Jackson, and Rudge (2011) conducted a qualitative study where they interviewed five couples who were childless due to infertility. The participants (male, n = 5; female, n = 5) were recruited through newspaper and website ads and had to meet the following inclusion criteria: (a) heterosexual, (b) childless due to infertility, (c) no longer receiving infertility treatment, and (d) willing to share their story. Prior to engaging in the study, they had completed
infertility treatment sometime within the last six months to ten years. The researchers met with each partner individually for a minimum of one hour and began each interview with the following question: “Tell me your story of remaining childless after infertility treatment.”

The researchers conducted extensive thematic analysis assessing commonalities amongst individuals as well as between dyads. The results indicated the following three main themes: (a) “the difficulties of living a different narrative”, (b) “the strong dyadic bond”, and (c) “setting achievable goals and redirecting creativity.” The theme “difficulties of living a different narrative” revealed that couples feel like they are living on the outskirts of society, not achieving normal milestones, and watching their friends and family build families that they are unable to have. The theme “the strong dyadic bond” revealed that couples felt a greater sense of resilience when they felt that their relationships were emotionally close. The theme “setting achievable goals and redirecting creativity” indicated that couples felt a sense of resilience in being able to plan for other aspects of their futures together. Overall, the implications of the study were that resilience in couples with infertility was found in overcoming adversity, thinking ahead to future goals, and being able to rely on each other through the adversity of infertility. Limitations of this study include the small sample size as well as the lack of diversity, as the researchers acknowledge that the majority of their sample was Caucasian. Although there are limitations, the study provides insight into how couples foster and promote resilience in their relationship as they face infertility. Moreover, future quantitative studies can determine the amount of influence of resilience when assessing couples with infertility.
Depression

Depression is the second leading cause of disability in the United States, as it effects 7.1% of adults (NIMH, 2017), and the primary cause of disability worldwide (World Health Organization, 2020). Depression effects more than 264 million individuals and is more severe than experiencing negative emotions, as it can be long-lasting and vary in severity, making it a serious health condition (World Health Organization, 2020). Moreover, depression is more likely to effect individuals who experience negative events and physical conditions.

Depression in Couples

Parmelee-Streck and Wood (2020) conducted a systematic review of the literature investigating dyadic studies where couples with breast cancer experienced depression. The purpose of the review was to identify a pattern in dyadic analysis to assess how depression in one partner may impact depression in the other partner. The review consisted of ten studies that met the inclusion criteria of investigating depression in dyads with breast cancer. Interrater reliability was achieved for the article reviewers (> .80). The design for evaluating the studies was derived from the criteria of the Effective Public Health Practice Project (EPHPP), which was identified as a reliable tool for assessing various design studies. The studies’ ($k = 10$) characteristics included a range in time (1983-2017) and a variety in studies conducted within the United States (40%) and outside the United States (60%). All of the studies included some form of measuring depression in the couples, such as the Centers for Epidemiologic Studies Depression Scale (CES-D; $k = 10$), the Hospital Anxiety and Depression Scale ($k = 2$), Beck Depression Inventory (BDI; $k = 2$), and the Brief Symptom Inventory (BSI; $k = 1$).

Results from the investigation indicated that relationship satisfaction influenced partner depression levels ($k = 5$), considering partners who experienced a greater degree of dyadic
coping and perceived themselves in better adjusted relationships had lower depression scores. Alternatively, partners that perceived lower relationship quality experienced greater levels of depression. Additionally, several studies \((n = 7)\) found that each partner’s level of depression was directly correlated with the other partner’s level of depression. Limitations of this review include: (a) a large span of time amongst the studies, and (b) a lack of studies that utilized more advanced statistical procedures to determine dyadic effects. Nevertheless, these findings suggest that across multiple studies, it has been found that partner’s experiencing a chronic health concern can directly impact each other’s level of depression.

Walker and colleagues (2017) conducted a longitudinal, cross-sectional study to examine depression and anxiety effects within couples when they sought consultation in primary care \((N = 13,507 \text{ couples})\) over the course of a 12-month period. Participants reported their age \((M = 52 \text{ years})\), number of consultations \((M = 5)\), and whether they sought consultation for anxiety \((n = 927, 3.4\%)\) or depression \((n = 538, 2\%)\). Data analysis included logistic regression where dyads were assessed as units for anxiety consultations and depression consultations.

Results indicated that females had a higher likelihood of seeking out consultation for anxiety \((OR 2.98, 95\% \text{ CI} 2.15, 4.13)\) or depression \((OR 4.45, 95\% \text{ CI} 2.79, 7.09)\) if their male partner also received consultation for the same issue. There was no difference found in the model when the outcome variable was reversed to assess for the effect of male partners seeking out consultation for the same condition when their female partner initially sought consultation for anxiety \((OR 2.46 95\% \text{ CI} 1.74, 3.47)\) or depression \((OR 3.39 95\% \text{ CI} 2.07, 5.55)\). Hence, the results from this study support the hypothesis that couples will experience similar mental health states, meaning that when one partner experiences anxiety or depression, the other partner has an increased likelihood of experiencing the same condition. Limitations of this study include the
fact that the researchers did not consider the quality of the relationship or the severity of the anxiety or depression symptoms. However, the study supports the need for further investigation into the actor and partner effects of experiencing psychological distress, such as depression.

**Depression and Relationship Satisfaction**

Knobloch-Fedders (2015) conducted a descriptive, correlational study investigating the relationship between relationship distress (*Dyadic Adjustment Scale* [DAS]; Spanier, 1988) and depression (*Beck Depression Inventory* [BDI-1A]; Beck & Steer, 1993) in adult heterosexual couples (*N* = 88). Participants were recruited via online and in person flyers, with the criteria of experiencing some form of relationship distress and/or depression symptoms. Exclusion criteria included: (a) suicidal ideation, (b) intimate partner violence, and (c) psychosis. Participants reported on whether they were married (77.3%), cohabitating (15.3%), or dating (7.4%), as well as the length of their relationship (*M* = 11.27 years; range [.25-65 years]). Also, participants disclosed their age (*M* = 43 years) and the following ethnicities: (a) Caucasian (70.9%), (b) African-American (12.2%), (c) Hispanic (8.7%), (d) Asian-American (5.8%), (e) Native American (1.7%), and (f) Bi-racial (.6%). Data analysis included the Actor–Partner Interdependence Model to assess both actor and partner effects on depression.

Results indicated that relationship distress was associated with disagreement amongst the partners, meaning that partners experienced more relationship distress when they perceived their partner with greater disagreement (*B* = .17, *p* < .05). Also, depression was significantly associated with relationship distress and demonstrated an actor effect (*B* = .18, *p* < .05) as well as a partner effect (*B* = .26, *p* < .01). Additionally, the partner of the depressed person more often had a self-perception of being controlling, which is likely due to a feeling of responsibility towards the depressed partner. A primary limitation of this study is that the researchers did not
measure depression as a clinical disorder and were unable to differentiate between depressive symptoms and clinical depression. Also, the sample was primarily Caucasian, which could inhibit generalizability. However, this study highlights the need for further investigation on couples’ relationship satisfaction and depression, especially when experiencing an adverse life experience.

Li and Johnson (2018) conducted a descriptive, correlational study to investigate the relationship between depression (*The inventory of Depressive Symptomatology-Self-Rated* [IDS-SR]; Rush et al., 1986) and relationship satisfaction (*The Revised Dyadic Adjustment Scale* [RDAS]; Busby et al., 1995; *The Communication Pattern Questionnaire-short form* [CPQ-SF]; Christensen, 1988) in couples (*N* = 63 couples) using dyadic data analysis. Participants were recruited from a family therapy clinic in the United States. Participants reported on their age (*M* = 32.13 years) and identified with one of the following ethnicities: (a) Caucasian (83.2%), (b) African American (7.2%), (c) Asian (4%), (d) Hispanic (3.2%), and (e) Other (2.4%). Also, participants reported on their length of relationship (*M* = 6.09 years) and if they were married (73%) or cohabitating (27%). The researchers utilized Actor-Partner Interdependence modeling as their form of data analysis.

Results indicated that there was a positive correlation between male and female depression scores (*r* = 5.28, *p* < .05) as well as male and female relationship satisfaction scores (*r* = 5.55, *p* < .001). The model that provided the most appropriate fit indicated that there were statistically significant actor effects of one’s own depression being negatively related to one’s own level of relationship satisfaction for both males (*B* = -.39, *p* < .001) and females (*B* = -.28, *p* < .05). Also, there was a significant partner effect of male depression scores predicting female relationship satisfaction scores (*B* = -.25, *p* < .10); however, there was not a significant partner
interaction for female depression scores predicting male relationship satisfaction scores.

Limitations of this study include: (a) the participants were very similar in that they were mostly Caucasian and all receiving counseling services at the family therapy clinic, (b) the sample size was small, which may have contributed to less power in the findings, and (c) the subscales on the communication questionnaire demonstrated low reliability. Nevertheless, this study supports the theory that couples experience interdependence and need to be assessed as dyadic units. Also, this study highlights that depression and relationship satisfaction are related.

Bartle-Haring and colleagues (2018) conducted a longitudinal, descriptive, correlational study to further investigate the effects of relationship satisfaction (Quality Marriage Index [QMI]; Norton, 1983), couple differentiation (Differentiation of Self Inventory [DSI]; Skowron & Friedlander, 1998), and depression (Center for Epidemiologic Studies-Depression scale [CESD]; Radloff, 1977) in adult couples (N = 412 couples) through dyadic data analysis. Participants were recruited from the Flourishing Families Project (FFP), which investigates family relationships. Participants reported on ethnicity (male, 86.6%; female, 81.3%), age (male, M = 44.7 years; female, M = 43 years), length of relationship (M = 18 years), and if this relationship was their first marriage (93.4%). The researchers utilized Actor-Partner Interdependence modeling as their form of data analysis and participant data was collected at three different time points, one year apart.

Results indicated that there were two mediating actor effects of differentiation. First, when a participant displayed higher depression scores at Time 3, with low differentiation, they displayed increased depression at Time 4 (estimate = 0.060, p < 05). Second, when a participant displayed higher relationship satisfaction scores at Time 3, with high differentiation, they displayed decreased depression at Time 4 (estimate = -0.006, p < 05). Results also indicated
significant mediating partner effects of differentiation. When one partner displayed high levels of relationship satisfaction at Time 3, and the partner has high differentiation, then the couple had increased relationship satisfaction at Time 4 (estimate = 0.021, \( p < .05 \)). Also, when males displayed high depression scores at Time 3, with low differentiation, females displayed lower relationship satisfaction at Time 4 (estimate = -0.110, \( p < .05 \)). Limitations of the study include that there were not clinically severe depression scores, the sample lacked diversity, and the DSI asks questions regarding several different kinds of relationships, not just romantic partners. However, this study highlights the value in using dyadic data analysis to determine actor and partner effects.

**Depression and Infertility**

Haimovici and colleagues (2018) conducted a correlational and cross-sectional study to investigate the association of stress (Daily Stress Inventory [DSI]; Brantley et al., 1987), anxiety (Psychiatric Settings Symptom-Assessment [SA-45]; Davison, 1997), and depression (Life Stressors and Social Resources [LISRES-A]; Moos et al., 1982) in couples with infertility (\( N = 45 \) couples) experiencing negative invitro fertilization (IVF) results. Participants disclosed the following demographic variables: (a) primary infertility (\( n = 38 \)), (b) age (male, \( M = 36 \) years; female, \( M = 35.5 \)), and (c) number of IVF attempts (range 1-5 attempts).

Results related to stress, anxiety, and depression indicated that there was a high prevalence of psychological distress in the couples receiving treatment (72%). Also, there were positive correlations within couples between female stress and male stress (\( r = .4, p < .05 \)) and female negative events and male depression (\( r = .3, p < .05 \)). Overall, there were significant positive correlations between individual stress and individual depression for men (\( r = .5, p < .05 \)), which support the hypothesis that stress related to infertility and infertility treatment...
demonstrates increased depression in couples. The researchers also discussed that there was a correlation between male depression, female stress, and failed IVF implantation (33%). A primary limitation of this study is the lack of clinical assessments for anxiety and depression and a lack of investigating the effects of one partner’s scores on the other. However, this study illustrates that couples struggling to conceive experience greater levels of depression, which in turn can negatively impact their ability to become pregnant through infertility treatment.

Lakatos and colleagues (2017) conducted a cross-sectional research study to compare anxiety (Spielberger State-Trait Anxiety Inventory [STAI-T]; Spielberger et al., 1970) and depression (Beck Depression Inventory [BDI]; Beck et al., 1961) related to infertility stress (Fertility Problem Inventory [FPI]; Newton et al., 1999) in infertile women (n = 134) compared to fertile women (n = 91). Participants were recruited online as well as from a clinical setting in Hungary. Furthermore, participant age (M = 33.30 years), income (primary infertility, 53% below average income; fertile, 79% below average), and duration of infertility (M = 3.61 years) was collected.

Researchers conducted parametric tests to compare depression and anxiety between the infertile and fertile women as well as between women receiving assisted reproductive treatment (ART) and those not receiving treatment. Results from the t-tests indicated that the group of women with infertility had significantly worse depression (t = 3.68, p < .0001) and anxiety (t = 5.04, p < .0001) than the women without fertility problems. Also, within the group of women experiencing infertility, the researchers conducted secondary analysis to investigate group differences in depression and anxiety for those receiving ART. Results from the t-tests indicated that there was a statistically significant difference in depression scores (t = 2.67, p < .01) between women receiving ART (M = 15.74) and those who were not receiving treatment (M = 65)
Therefore, women who were receiving treatment experienced significantly worse symptoms of depression. Limitations of this study include the lack of generalizability to a different cultural population as the study was conducted in Europe, a small sample of fertile women compared to the group of women with infertility, and not including secondary infertility in the demographic factors. An additional limitation is the lack of a more sophisticated analyses to detect group differences, as multiple t-tests can result in a Type I error. Nevertheless, this study highlights the prevalence of depression in women experiencing infertility and supports the need for further investigation into the effect of depression on couples experiencing infertility.

**Depression and Couples with Infertility**

Maroufizadeh and colleagues (2018) conducted a descriptive, correlational research study investigating the relationship between depression (*Patient Health Questionnaire*-9 [PHQ-9]; Kroenke & Spitzer, 2002) and quality of life (*Fertility Quality of Life* [FertiQoL]; Boivin, Takefman, & Braverman, 2011) in infertile couples (*N* = 180). The participants (men, *n* = 180; women, *n* = 180) were recruited from a fertility clinic in Iran through convenience sampling. The couples completed their questionnaires individually. The demographics collected included: (a) age (male, *M* = 34.31 years; female, *M* = 30.54 years), (b) length of marriage (*M* = 6.72 years), (c) reason for infertility (male factor, 45%; female factor, 17%; both, 13%; unexplained, 45%), and (d) type of infertility (primary, 75%; secondary, 25%).

Result of the Actor-Partner Interdependence Model indicated that both male and female depression scores had an actor effect on their own individual quality of life (male, β = −0.589, *p* < 0.001; female, β = −0.588, *p* < 0.001). Also, the husband’s level of depression had a significant partner effect on the wife’s quality of life (β = −0.128, *p* < 0.05), however, the wife’s depression scores did not significantly impact the husband’s quality of life. Therefore, husbands’
level of depression significantly impacted their own and their partner’s quality of life related to infertility. Limitations reported from this study include the lack of generalization to other culture populations, the presence of multicollinearity between the measures, and the presence of possible covariates. However, this study supports that the presence of depression in couples with infertility can have an impact on both the individual and partner’s fertility related quality of life. Hence, it is necessary to further investigate the presence of depression in couples with infertility as well as the inverse relationship of a couple’s fertility related quality of life on depression.

**Shame**

Shame is a painful, negative emotion where the individual experiences themselves as flawed in a fundamental way (Brown, 2006). Shame can be understood as related to psychological, social, and cultural components (Brown, 2006), which all relate to the purpose of this study. Brown (2006) conducted a grounded theory research study to investigate women and shame, to explain how shame impacts women, and understand the reasons why women experience shame. The researcher utilized continuous and purposive theoretical sampling to acquire a diverse sample. Participants (N = 215) identified as age (M = 40 years) and one of the following ethnicities: (a) Caucasian (47%), (b) African American (30%), (c) Latina (18%), and (d) Asian-American (5%). Participant interviews (M = 60 minutes) were conducted by the researcher and a research team, with strong interrater reliability, to investigate the overall experience of shame, varying definitions of shame, and ways to overcome shame. The constant comparative model was utilized for data analysis.

The results derived the shame resilience theory (SRT), with shame being defined as “an intensely painful feeling or experience of believing we are flawed and therefore unworthy of acceptance and belonging.” Shame resilience consists of the following spectrums: (a) acceptance
of personal vulnerability, (b) awareness regarding social and cultural expectations, (c) reaching out to others to form empathy building relationships, and (d) the ability to speak out about shame with emotional understanding. Moreover, the construct of shame was theorized to have psychological, social, and cultural domains. The psychological component consists of the individual’s personal thoughts and feelings about the self, the social component consists of shame that is connected to interpersonal relationships, and the cultural component consists of the individual’s feelings of meeting cultural expectations. Overall, SRT proposes that shame is a complex negative emotional experience where the individual believes they are flawed in a pivotal way. This theory supports the need to investigate the experience of shame as psychological, social, and cultural in individuals and couples with infertility.

**State Versus Trait Shame**

State shame refers to experiencing shame as the result of a temporary, external event, while trait shame is a more pervasive shame where the individual feels an internalized manifestation of inferiority (Claesson, 2002; Rosario & White, 2006). For the purpose of this study, shame is defined as feeling inferior, inadequate and with a sense of self-hatred (Gilbert et al., 2004). Trait shame has been selected for this particular study, because it is believed that infertility effects the core of some women who find their identity as a mother. Hence, the following examples of investigations on the impact of shame are specifically geared towards trait shame.
Shame and Couples

Martins and colleagues (2016) conducted a descriptive, correlational study investigating the mediating role of internal (Internal Shame Scale [ISS]; Cook, 1996) and external shame (Other As Shamer Scale [OAS]; Allan et al., 1994) of attachment style (Experiences in Close Relationships-Relationship Structures [ECR-RS]; Fraley et al., 2011) on dyadic adjustment (Revised Dyadic Adjustment Scale [RDAS]; Busby et al., 1995) in adults (N = 228). The sample was comprised of Caucasian participants from the Portuguese population. Participants were all heterosexual and reported on the following demographic variables: (a) age (M = 33.77 years), (b) length of relationship (M = 9.89 years), and (c) gender (male, n = 62; female, n = 166). Researchers conducted bivariate correlations as well as mediation analysis.

Results from the bivariate correlations indicated that there was moderate correlation between dyadic adjustment and internal shame (r = -.42, p < .001) as well as dyadic adjustment and external shame (r = -.34, p < .001), meaning that the greater dyadic adjustment in the relationship, the less shame. Path analysis indicated that there was a significant association amongst internal shame, external shame, and avoidant attachment (B = 3.73, p < .001), meaning that individuals with higher levels of shame tend to avoid emotional connection with their partners. Also, dyadic adjustment was significantly associated with attachment anxiety and internal shame (B = -.16, p < .001), meaning that individuals with higher levels of dyadic adjustment tend to have less internal shame and less anxiety surrounding their relationship. Overall, internal shame and external shame, mediated the effect of attachment avoidance on dyadic adjustment (B = -.62, p < .001), meaning that individuals who avoid attachment in their relationships have less dyadic adjustment, which results in higher levels of internal and external shame. Limitations of this study include a high correlation between internal and external shame.
(r = .68, p < .01), which may affect the results as well as a lack of generalizability to other populations. Also, the researchers spoke to a need to include the couple when assessing for shame and dyadic adjustment. However, this study highlights the significant relationship between shame and relationship satisfaction and connection as well as supports the need to assess the effect of shame in couples.

**Shame and Relationship Satisfaction**

Davis and colleagues (2017) conducted a descriptive, correlational study investigating the relationship between shame (*Experience of Shame Scale* [ESS]; Andrews et al., 2010), relationship satisfaction (*Revised Dyadic Adjustment Scale* [DAS]; Busby et al., 1998), and several other pain related variables in adult men (N = 110) with Peyronie’s disease (PD, a disease that effects men’s sexual functioning). Participants reported on their age (M = 55.6 years), length of relationship (M = 23.6 years), if they were in a stable relationship (77.3%), and length of experiencing PD (M = 4.14 years). Researchers utilized bivariate correlations and regression analysis.

Results from the bivariate correlations indicated that there was a significant negative relationship between shame and relationship satisfaction (r = -.37, p < .01), meaning that participants that experienced greater relationship satisfaction tended to experience less shame. The results from the regression analysis model indicated that there was a significant association between increased relationship satisfaction, decreased shame, increased positive responses from partners, and decreased negative responses from partners (R² = 0.37, p < 0.001). Hence, the model signifies that greater levels of relationship satisfaction were predicted by lower shame scores. Limitations of this study include the lack of including partners in the data analysis and the fact that some men in the study were not in a relationship (22.7%), which could affect the
results of relationship satisfaction scores. However, the results from this study support that there is a significant relationship between shame and relationship satisfaction in individuals experiencing a chronic health condition and highlights the need for dyadic data analysis when assessing shame.

Dirkse and colleagues (2014) conducted a correlational study to investigate the relationship between shame and guilt (*State Shame and Guilt Scale* [SSGA]; Marschall et al., 1994), depression (*Center for Epidemiologic Studies–Depression Scale* [CES-D]; Radloff, 1997), and relationship satisfaction (*Locke–Wallace Marital Adjustment Test* [LWMAT]; Locke & Wallace, 1994) in lung cancer patients and their partners (*N* = 16). Participants reported on age (*M* = 65 years), gender (male, 63%; female, 37%), length of relationship (*M* = 36 years), and ethnicity (100% White). Researchers utilized Spearman correlations as their method of data analysis.

Results indicated that there was a moderate negative relationship between patient’s shame and relationship quality (*r* = -.61), meaning that patients who experienced greater levels of shame, experienced lower levels of relationship satisfaction. Also, for partners, there was a moderate negative relationship between guilt and relationship quality (*r* = -.49), meaning that partners who experienced greater levels of guilt, experienced lower levels of relationship satisfaction. Additionally, patients illustrated a strong positive relationship between shame and depression (*r* = .87) and partners illustrated a moderate positive relationship between shame and depression (*r* = .67), meaning that as participants experience greater levels of shame, they also experience greater levels of depression. Limitations of the study include a small sample size and an older population, which may limit generalizability. Also, there was a lack of diversity in the sample and the data analysis could have been strengthened by considering each dyad as a unit.
However, the study does substantiate that there is a relationship between shame, relationship satisfaction, and depression.

**Shame and Depression**

Trindade and team (2018) conducted a descriptive, correlational study investigating the effect of shame (*Chronic Illness-related Shame Scale* [CISS]; Trindade et al., 2017), body image (*Body Image Scale* [BIS]; Hopwood et al., 2001), and cognitive fusion (*Cognitive Fusion Questionnaire—Chronic Illness* [CFQ-CI]; Trindade et al., 2018) on depression (*Depression Anxiety Stress Scales* [DASS-21]; Lovibond & Lovibond, 1995) in adult women with breast cancer (*N* = 75) actively receiving treatment at a facility in Portugal. The researchers defined cognitive fusion as the process of attaching an emotion or thought to an experience, such as chronic illness. Participants reported their age (36-50 years, *n* = 19; 51-65 years, *n* = 39; 66-86 years, *n* = 17), and marital status as married (77.3%), single (9.3%), widowed (8%), or divorced (5.4%).

Results indicated that there was a significant positive relationship between shame and depression (*r* = .68, *p* < .001), meaning that as individuals increase in shame, they also increase in symptoms of depression. Also, there was a significant relationship between shame and cognitive fusion (*r* = -.64, *p* < .001), meaning that as individuals increase in attaching negative emotion to their experience, they also increase in shame, in turn increasing in depression. Hence, the message that individuals take on themselves from their chronic illness experience increases shame and depression. The results of the path analysis indicated that the process of cognitive fusion was a significant mediator between shame and depression (*B* = .27, *p* < .01), while shame had an overall effect on depression (*B* = .79, *p* < .01). Limitations include correlations between constructs, representing that constructs may influence each other, a broad age range among
participants, and a weak generalizability to other cultures. However, this study substantiates that there is a relationship between shame and depression in women experiencing a chronic illness.

Gilbert and colleagues (2014) conducted a descriptive, correlational study investigating the relationship between clinically depressed patients’ \((N=53)\) feelings of self-compassion (\textit{Self-Compassion Scale} [SCS; ]), self-criticism (\textit{Forms of self-criticism/Self-reassuring scale} [FSCRS; Gilbert et al., 2004]), and depression (\textit{Depression, anxiety and stress scale} [DASS-21; ]). The participants \((N=53; \text{ males, } n = 21; \text{ females, } n = 32)\) were recruited from acute wards \((n = 12)\), hospitals \((n = 20)\), and support groups \((n = 21)\), and had a confirmed diagnosis of depressive disorder. The DASS-21 indicated that the majority of the participants had a severe depressive diagnosis (66%).

Results from the multiple linear regression analysis indicated that self-criticism significantly predicted depression \((F = 42.02, p < .001)\). Additionally, self-criticism predicted depression through the mediator of fear of self-compassion \((F = 36.56, p < .001)\). The results of the study indicate that individuals who experience greater levels of self-criticism, also experience a greater levels of depression. Also, those who experience self-criticism and depression, may have difficulty experiencing self-compassion. In sum, evidence from this study supports the need for further research to determine the impact of self-criticism, a valuable aspect of shame, on depression.

Rice and Fallon (2011) conducted a descriptive, correlational study with two time points of data collection, investigating the relationship between shame (\textit{Experiences of Shame Scale} [ESS]; Andrews et al., 2002), rumination (\textit{Ruminative Responses Scale} [RRS]; Treynor et al., 2003), and depression (\textit{Patient Health Questionnaire} [PHQ-9]; Kroenke et al., 2001) in adult individuals \((N = 65)\) experiencing relationship difficulties (\textit{Stressful Life Events Checklist})
[SLEC]; Costello & Devins, 1988) with their partners. Participants (male, \( n = 36 \); female, \( n = 39 \)) reported on their age (male, \( M = 34.17 \) years; female, \( M = 29.86 \) years) and if they were married (\( n = 11 \)) or cohabitating (\( n = 15 \)). Also, participants disclosed if they had a history of depression (41.5%). Data was collected from participants at the onset of the study and then again fifteen weeks later.

Results indicated that were significant positive correlations between rumination and shame at Time 1 (\( r = .60, p < .01 \)), shame and relationship difficulties at Time 2 (\( r = .29, p < .05 \)), shame and depression at Time 2 (\( r = .51, p < .01 \)), and relationship difficulties and depression at Time 2 (\( r = .35, p < .01 \)). Hence, as individuals experience greater shame, they also experience increased relationship difficulties and increased depression. Furthermore, results from the path analysis indicated that shame fully mediated the association between rumination and depression (\( B = 1.17, p < .001 \)) with relationship difficulties as a significant covariate, meaning that shame significantly effects depression. Limitations of the study included a disproportionate amount of men to women, lessening the power of discovering group differences. Also, the study did not assess for relationship satisfaction in connection to relationship distress and allowed for participants with a pre-existing condition of depression. Nevertheless, the study highlights to effect of shame on depression, especially when relationship difficulties are present.

**Shame and Infertility**

Galhardo and colleagues (2011) conducted a quasi-experimental study to compare depression (Beck Depression Inventory [BDI]; Beck et al., 1961), anxiety (State Anxiety Inventory Form Y [STAI-Y]; Spielberger, 1983), external shame (Others as Shamer [OAS]; Goss et al., 1994) internal shame (Experience of Shame Scale [ESS]; Andrews et al., 2002), and self-compassion (Self-Compassion Scale [SELFCS]; Neff, 2003) amongst three groups of couples (\( N \))
= 480 dyads). The three groups included a control group with fertile couples ([fertile], male, n = 100; female, n = 100), a group of infertile couples ([infertile], male, n = 100; female, n = 100), and a group of infertile couples planning to adopt ([adoption], male, n = 40; female, n = 40).

The researchers conducted univariate analysis to determine group mean differences regarding each measure. Significant group differences were found for depression \( (F = 21.21, p < .001) \), anxiety \( (F = 21.28, p < .001) \), external shame \( (F = 9.48, p < .001) \) internal shame, \( (F = 17.52, p < .001) \) and self-compassion \( (F =12.15, p < .001) \). Mean scores also illustrated that the participants in the infertile group experienced the highest level of shame \( (M = 49.91) \). Results of regression analysis indicated that internal shame \( (B = .18, p < .05) \) and external shame \( (B = .26, p < .001) \) predicted depression in infertile couples. Regarding gender differences, women demonstrated higher levels of internal shame \( ( \text{female}, M = 54.86; \text{male}, M = 44.95) \) and self-judgement \( ( \text{female}, M = 38.44; \text{male}, M = 31.55) \). A primary limitation of the study was not controlling for the stage of medical treatment the infertile couples may be in, or the type of infertility the couple was experiencing. Also, a limitation of the study is the lack of generalizability due to the study being comprised of participants from Portuguese backgrounds. Lastly, this study relied on univariate analysis rather than more complex analysis that could assess for dyadic influence on scores. Nevertheless, this study highlights the presence and significance of internal shame and external shame in couples with infertility. Also, this study provides insight into how individuals experiencing infertility may feel internal trait shame, which captures the emotionally painful experience of infertility.

Taylor (2018) conducted a phenomenological qualitative investigation into the experiences surrounding infertility in African American couples \( (N = 6 \text{ dyads}) \) as infertility rates tend to be higher amongst this group than in other ethnicities. Participants were each interviewed
individually and then again as a couple. Interviews lasted longer with the women (60 minutes) than they did with the men (25 minutes) or as a couple (25 minutes). Interview questions consisted of broad open-ended questions surrounding the experience of infertility as well as follow-up questions regarding the state of the relationship at it pertains to infertility. Participant demographics included age ($M = 41$ years), length of marriage ($M = 10.5$ years), and if they were experiencing primary infertility ($n = 5$ dyads).

The results of thematic analysis indicated the following three main themes: (a) infertility is a traumatizing event, (b) the distress of infertility impacts one’s sense of self, and (c) spirituality plays an important role in overcoming the shame of infertility. Additionally, there were categories of experience: (a) feelings of failure, which were indicated by a sense of shame surrounding not being able to become pregnant, (b) vision of future life derailed, which was indicated by feeling defective and shameful about not achieving motherhood, (c) there is a need for couple cohesion, which was indicated by couples sharing that infertility required a sense of support from the other, and (d) cultural shame, which was indicated by couples speaking to the shame of not being able to conceive considering the cultural myth that African Americans are very fertile. A limitation of the study is that the interview length with the couple was much shorter than it was with the females and the sample may not be generalizable to other races or ethnicities. However, this study highlights the effects of shame in couples with infertility. Also, this study supports the need for quantitative investigations into the experience of shame in couples with infertility as many prior investigations regarding this topic have been through qualitative methods.

Another study conducted by Ceballo, Graham, and Hart (2015), investigated the experience of shame associated with infertility through qualitative interviews with fifty African
American women. This study was the first to focus solely on the experiences of African American women. Participants \((N = 50)\) age \((M = 37\) years), relationship status (married, \(n = 37\); single, \(n = 7\); separated or divorced, \(n = 7\)), education (college, \(n = 28\); high school, \(n = 19\); none, \(n = 3\)), length of infertility \((M = 5.4\) years), and type of infertility (primary, \(n = 41\); secondary, \(n = 9\)) was collected.

The researchers conducted thematic analysis and determined a primary theme (98% of responses) of silence and isolation, which highlights the women’s sense of internal shame for their inability to conceive and secrecy of their shame from their partner. Secondary themes that emerged were identity as a mother (32% of responses) and discrimination in medical settings (26% of responses). Identity as a mother speaks to participants believing that their identity was founded in motherhood, and without the ability to conceive there was a sense of personal failure. Discrimination in medical settings spoke to how the participants had experienced discrimination based on race or social class with their infertility doctor. The experience of discrimination increased discomfort when pursuing treatment. There are limitations worth noting. First, participants gave retroactive accounts of their experience, which may increase the level of bias. Second, only one partner was included in the interview. However, the results of this study demonstrate that women struggling with infertility are more likely to experience internalized shame in isolation, without support of their partner, due to keeping their infertility distress secret.
Chapter Two Summary

Infertility is a prevalent and distressing experience for many couples, making it a public health concern (Wamser-Nanney, 2019). Infertility effects the couples on a biological, psychological, and relational level (Gerrity, 2001). Moreover, considering infertility can affect the relationship amongst couples, it is appropriate to examine the experience of infertility through an integrated theoretical framework of the Biopsychosocial Theory of Infertility and the theory of Dyadic Coping. Furthermore, couples that experience infertility tend to have lower levels of fertility related quality of life, which in turn decreases the couples’ level of relationship satisfaction, increases symptoms of depression, and increases a sense of shame (Kim et al., 2018; Zurlo, 2018). Furthermore, relationship satisfaction has been shown to influence chronic health conditions (Novak et al., 2019), making it a valuable construct worth investigating in association with fertility related quality of life. Additionally, resilience has been found to decrease symptoms of depression amidst stressful life events (Dolphin et al., 2015; Sharpley et al., 2020). Lastly, couples with infertility tend to experience greater levels of shame considering that many individuals view their inability to conceive as a faultiness within themselves (Ceballo et al., 2015; Galhardo et al., 201). This shame then increases symptoms of depression and can decrease relationship satisfaction as couples experience their distress related to infertility in isolation. Yet, relationship quality can also improve depression and distress related to infertility (Maroufizadeh et al., 2018). In conclusion, unique relationships exist in the literature for (a) fertility related quality of life and relationship satisfaction, (b) fertility related quality of life and depression, (c) resilience in relationships and depression, (d) infertility and shame, and (e) relationship satisfaction and chronic health conditions. These associations seem to be related within the individual and between partners in a couple. Hence, the theory of Dyadic Coping corroborates
the interdependence of experiences related to an individual’s physical, psychological, and relational health. However, these particular constructs have not yet been analyzed in a dyadic structure. Therefore, the current study seeks to employ structural equation modeling (SEM) and the actor-partner interdependence model (APIM) to investigate the influence of fertility related quality of life on relationship satisfaction, resilience, depression, and shame.
CHAPTER THREE: METHODS

Research Design

This investigation utilized a descriptive, correlational research design to examine the directional relationship between fertility related quality of life, relationship satisfaction, resilience, depression, and shame amongst individuals and couples with infertility. Correlational method is a non-experimental research design that allowed the researcher to assess the relationship amongst multiple variables without independent variable manipulation (Creswell, 2014). Also, correlational research assessed the direction and strength of the relationship as well as allowed the researcher to predict the influence of one variable on another variable (Creswell, 2014). Commonly utilized in social and behavioral science, such as counseling, correlational research can effectively analyze the relationships amongst several variables in a single study (Creswell, 2014). Although causation cannot be explicitly determined with correlational methods, robust analyses such as Structural Equation Modeling (SEM) and Actor Partner Interdependence (APIM) Modeling, can elucidate potential causal relationships by analyzing the complex relationships amongst variables (Kenny et al., 2006; Kline, 2016; Tabachnick & Fidell, 2013). Actor Partner Interdependence Modeling is conducted through the use of dyadic data analysis and assessed the influence each partner has on their own outcome variable as well as their partner’s outcome variable (Kenny et al., 2006).

Population and Sampling Procedures

The purpose of this study was to utilize a descriptive, correlational research design to examine the directional relationship between fertility related quality of life, relationship satisfaction, resilience, depression, and shame amongst individuals and couples with infertility. For this study, the population of interest included couples in a romantic relationship where
partners are over the age of 18 years old and have been unable to conceive a child for a minimum of six months. Moreover, considering the use of dyadic data analysis where the couple is considered the unit of analysis, it is encouraged that both partners be willing to participate in the study, although individual partners were still welcome to participate. Couples with infertility experience a myriad of stressors (Greil et al., 2011). As such, from the review of literature, the researcher identified decreased levels of quality of life (Zurlo et al., 2018), decreased relationship satisfaction (Greil et al., 2018), increased levels of depression (Maroufizadeh et al., 2018b), and increased shame in individuals surrounding their infertility (Ceballo et al., 2015). Convenience and snowball sampling and community-based recruitment were the primary methods of recruiting diverse individuals and couples with infertility. Also, to confirm that participants met the necessary inclusion criteria, demographic questions were included regarding length of experienced infertility.

**Sample Size in Structural Equation Modeling and Actor-Partner Interdependence Modeling**

Required sample size must be determined prior to data collection to accurately provide population representation and achieve appropriate statistical power (Kline, 2016). Adequate sample size reduces the chances of obtaining a Type II error, or a “false negative.” Additionally, adequate sample size is suggested to achieve high power (i.e., value of 0.8 or higher) to further reduce the chances of making a Type II error (Kline, 2016). Furthermore, the assumption that larger sample sizes provide the opportunity for greater generalizability is widely accepted (Kline, 2016). However, there are multiple methods for determining the required sample size for an investigation using SEM and APIM estimated by SEM. Due to the complexity of the analysis, larger sample sizes are preferred for these particular methods. Specifically, in SEM, adequate sample size is foundational to obtaining model fit, achieving power, and estimating reliable
parameters (Schumaker & Lomax. 2016). As of yet, there is no single determined method for estimated sample size in SEM and APIM; however dyadic researchers have adopted a recommendation for a minimum sample size of 200 dyads (Kenny, Kashy, & Cook, 2006) or 250-500 individuals (Schumaker & Lomax, 2016). There are two primary methods for calculating a priori sample size provided by Soper’s (2018) SEM statistical calculator and Kenny’s (2019) APIM statistical calculator. Based on Soper’s (2018) SEM statistical calculator, there is a recommended sample size of 400 participants to identify a small effect size (0.2) at a high power (0.8) with five latent variables (i.e., Fertility Quality of Life, Relationship Satisfaction, Resilience, Depression, and Shame) and ten observed variables (i.e. Fertility Quality of Life subscale total scores[Emotional, Mind-Body, Relational, Social], Couples Satisfaction Inventory total score, Resilience total score, Depression total score, and Shame subscale total scores[Inadequate Self, Hated Self, Reassured Self]) at the probability of p < .05. Alternatively, using the statistical calculator, the APIMPower application on www.Davidakenny.net (Kenny & Ackerman, 2019), the researcher conducted a second a priori power analysis. Based on Kenny’s (2019) statistical calculator, there is a recommended sample size of 91 dyads to detect actor effects and partner effects to achieve a small effect size (0.20) at a high power (0.8) with the probability of p < .05. Considering the primary analysis was SEM, the intended sample size for this investigation was 400 participants including 91 dyads, as that sample size would achieve necessary power through structural equation modeling as well as meet the minimum recommended sample size to detect actor and partner effects.
**Sampling Procedure**

The population of interest for this investigation were individuals and couples with infertility. The identified target sample had the following inclusion criteria: (a) couples over the age of 18 years old, (b) identify as in a relationship together for a minimum of one year, (c) experience self-identified primary or secondary infertility for a minimum of six months, and (d) both partners are willing to participate in the study, although individual partners are still encouraged to participate. To meet the sample size requirement, the sample was recruited from a variety of community settings, both online and face to face, that specifically serve a diverse population. The researcher provided an incentive of making a $1 donation per individual participant to a infertility research and advocacy group. Participants selected one of the following three organizations: (a) RESOLVE: The National Infertility Association, RESOLVE is a non-profit, 501(c)(3) dedicated to providing access to infertility services, legislative advocacy, education, and community support to individuals with infertility (RESOLVE: The National Infertility Organization, 2020), (b) the Cade Foundation dedicated to providing financial support to couples seeking infertility treatment, and (c) ASRM: American Society for Reproductive Medicine, dedicated to researching infertility and providing support to couples. Also, due the COVID pandemic, the sole method of recruitment was via an online platform. COVID impeded the accessiblity for face to face recruitment and data collection, hence, the research utilized a solely online recruitment plan and designed a website to increase accessibility.

**Face to Face Recruitment.** Face to face recruitment was not possible due to the COVID pandeminc. However, the following counseling locations, many who specifically serve diverse clientele, were connections the researcher made: (a) CLIMB Wellness & Counseling, (b) Perinatal Wellness and Psychological Services, (c) Solace Counseling, (d) Pinnacle Counseling
Institute, (e) The Brave Ones Therapy Center, (f) My Fertility Care, and (g) Healing With Wisdom. Face to face recruitment will occur at the following medical locations: (a) Winnie Palmer Hospital, (b) Advent Health for Women, (c) Orlando Health Associates, (d) Center for Reproductive Medicine, (e) Fertility Counseling Orlando, (f), Jenny Joseph, Midwife, (g) Orlando Fertility Clinic, and (h) word of mouth connections from individuals within the tight-knit community of women with infertility. Due to the COVID pandemic, the researcher was unable to visit any of the locations listed, and instead focused on an online recruitment plan.

**Online Recruitment.** Online recruitment was the primary method of recruitment, with a strong emphasis on online social support groups primarily serving a diverse population. Several of the following online platforms specifically serve a diverse clientele: (a) Touchstone Institute, Illinois (b) National Infertility Association (RESOLVE), (c) New Vision Counseling Center, Georgia, (d) RESOLVE support group, (e) Endometriosis Support Group (social media), (f) Infertility support group (social media), and (e) word of mouth connections from individuals within the tight-knit community of women with infertility. Recruitment consisted of the researcher contacting various settings and scheduling virtual appointments to meet with the leaders of the organizations and clinics. The various settings were provided a digital flyer as well as a link to the study website. Also, the researcher contacted the leaders of virtual meeting spaces, such as support groups, to ask permission to distribute a virtual digital flyer on their online platform. The flyer and website clearly indicated the purpose of the study, parameters of participants involvement, researcher contact information, and details on the incentive. Specifically, the researcher developed a website with all study materials, information regarding the purpose of the study, and resources for individuals and couples experiencing infertility. Considering the website had direct access to the survey, participants were informed that their
participation in the study was anonymous for the purpose of increasing participation regarding a sensitive topic.

To achieve the desired sample size \((N = 400)\), the researcher estimated response rates. Results from prior studies investigating infertility in couples in the United States achieved a response rate of 53% through active recruitment (Greil, 2018). However, other studies using survey research in social sciences achieved a response rate of approximately 30% through active (Tabet, 2019). Hence, the present study projected that with the lower 30% response rate, a minimum of 1,340 individuals would need to be contacted to accommodate the minimum sample size of 400 individuals. Considering that the majority of recruitment occurred through an online platform with a combination of active and passive recruitment, the response rates were calculated by the following: (a) the number of clicks on the survey link compared to the number of completed surveys, (b) the number of clicks to the website link compared to the number of clicks to the survey link, and (c) the number of participants that began the survey but did not complete the survey.

**Data Collection and Procedures**

Participation on behalf of the individuals and couples with infertility was voluntary, and the participants could decide to withdraw from the study at any point. Prior to any recruitment of participants as well as data collection, the researcher received approval from the University of Central Florida’s Institutional Review Board (IRB). The researcher submitted an application to the IRB including (a) the exempt research protocol form (HRP-255), (b) participant recruitment flyer and website, (c) the informed consent, (d) demographic questionnaire, and (e) all assessment instruments (FertiQol, CSI, CD-RISC, PROMIS, and FSCRS) with items designated as forced response. The informed consent contained a brief rationale for the study, purpose of the
study, information regarding the assessments, the estimated length of time the assessments will take, a detailed explanation of the confidential and anonymous nature of the study, and the researcher’s contact information. Additionally, the researcher obtained permission to use the instruments chosen for assessment in this investigation. Four of the instruments that were used in this study were available for free online, while one instrument (CD-RISC) was available for purchase through the publisher with a doctoral student discount.

To assess easibility and legibility of the assessments, the researcher distributed the survey link to the dissertation committee and peers. The volunteers to test these assessments were asked to record the amount of time it took them to complete the survey as well as their impression of readability and clarity. Upon receipt of this feedback, the researcher adjusted instructions and wording on the survey accordingly.

**Face-to-Face Collection**

Upon receiving IRB approval, the researcher planned to schedule appointments to meet with couples who demonstrated interest to participate in the study. For face-to-face data collection, the potential participants would have been given a coded manila envelope that included (a) informed consent; (b) general demographic form; and (c) assessment instruments (FertiQol, CSI, CD-RISC, PROMIS, and FSCRS). Also, participants would have been informed that all data collected is de-identified and anonymous. However, due to the COVID pandemic, the research was unable to schedule face-to-face data collection appointments.

**Web-Based Collection**

The study website had a direct link to the survey found on Qualtrics, a secure and password protected site. The website was linked to several online support groups as well as shared through various infertility clinics and counselors. Participants anonymously visited the
website and made the decision to complete the survey. The survey included (a) informed consent; (b) general demographic form; and (c) assessment instruments (FertiQol, CSI, CD-RISC, PROMIS, and FSCRS). Participants were reminded that the survey was voluntary and they can withdraw from the study at any time. Also, participants were informed that all data collected is de-identified and anonymous. For participants that were able to complete the survey in conjunction with their partner, surveys were anonymously linked to their partners by the participants entering the numerical digits of their street address plus the first letter of the city in which they met their partner. Should the partners live separately, they were asked to enter in the information for the address of the female partner or primary partner with infertility. At the end of the survey, participants were thanked for their time and participation in the study, as well as reminded of the contribution made on their behalf to an infertility organization on their behalf.

**Instrumentation**

The researcher utilized six data collection instruments for this investigation, including: (a) general demographic form, (b) FertiQol (Boivin et al., 2011), (c) CSI (Funk & Rogge, 2007), (d) CD-RISC (Campbell-Sills & Stein, 2007), (e) PROMIS Depression (Cella et al., 2010), and (f) FSCRS (Gilbert et al., 2004). The researcher obtained permission to use the instruments for this investigation and administer them electronically (e.g., Qualtrics). The following section presents the psychometric features of the four data collection instruments.

**General Demographic Questionnaire**

The general demographic questionnaire is a researcher-created instrument designed to collect relevant data from the participants for the current study. Demographic information allows the researcher to know if the sample is an accurate representation of the targeted population (Salkind, 2010). The current demographic questionnaire will consist of 9 items. The relevant
items will include the following: (a) age, (b) gender (c) race, (d) ethnicity, (d) education, (e) household income, (f) rural or urban living, (g) employment status, (h) geographic location, (i) relationship status, (j) impact of infertility on relationship status (k) length of relationship, (l) length of time experiencing self-identified infertility (inclusion/exclusion question), (m) type of infertility, (n) cause of infertility, (o) if the couple has sought professional help for their relationship (mental health, marriage and family, psychology), (p) if the couple has sought medical help for infertility (see Appendix B), (q) selection of organization to receive $1 donation. Participant selected options for race include: (a) American Indian/Alaska Native, (b) Asian, (c) Black/African American, (d) Native Hawaiian/Other, (e) Pacific Islander, (f) White, (g) Bi-racial or (h) Other. Based on federal categorizations, participant selected options for ethnicity are Hispanic or non-Hispanic. Couple relationship status options will include: (a) committed relationship with cohabitation, (b) committed relationship without cohabitation, and (c) married. Also, the questionnaire will have three scale items that include rating access to care, rating overall stress level, and rating the important of faith or spirituality (see Appendix B). Data collected from the demographic questionnaire will be analyzed as continuous variables (i.e., age, length of relationship, length of infertility) or categorical variables (i.e., race, ethnicity, gender, relationship status, professional help seeking, income, education, region, type of infertility, and cause of infertility).

**Fertility Quality of Life Tool (FertiQol)**

Fertility related quality of life is a new construct identified by researchers as an effective way to describe quality of life specifically related to individuals with infertility (Boivin et al., 2011). The FertiQol is the only established assessment with the explicit purpose of measuring quality of life in females and males with infertility (Boivin et al., 2011). Moreover, the FertiQol
is believed to be the “gold standard” in measuring fertility related quality of life as the assessment encompasses the impact of infertility distress on quality of life across four primary domains and has been successfully translated into many languages, making it an international measure for fertility related quality of life (Donarelli et al., 2016). The assessment measures fertility related quality of life as having an impact on the emotional, mind-body, relational, and social aspects of an individual’s life.

The FertiQol consists of 26 total items with four subscales (see Figure 2). The first subscale includes six items related to the emotional domain of quality of life, which consists of the impact of fertility related distress on the individual’s emotions, such as sadness, resentment, and grief. An example item includes: “Do you experience grief and/or feelings of loss about not being able to have a child (or more children)?” Also, there are six items related to the domain of mind-body, which consists of the impact of fertility on the physical body such as symptoms of pain or fatigue, as well as how those symptoms impact cognition and behavior. For instance, the individual may be unable to perform daily activities due to the physical symptoms, which in turn may affect concentration, with a sample item stating: “Do you feel drained or worn out because of fertility problems?” Additionally, there are six items related to the impact of fertility distress on relationships, such as sexuality, impact on the partnership, and feelings of commitment. An example item includes: “Are you and your partner affectionate with each other even though you have fertility problems?” Lastly, there are six items related to the social domain, which includes how fertility impacts feels of social inclusion, expectations of the self in relation to others, and feelings of support. An example item includes: “Are you satisfied with the support you receive from friends with regard to your fertility problems?” The assessment also includes two introductory items that rate overall perceived satisfaction with life.
Psychometric Properties of the FertiQol

Boivin and colleagues (2011) tested the measure on 1,414 individuals with fertility issues through online \((n = 1,048)\) and face to face \((n = 366)\) methods at fertility clinics across the world (female, \(n = 1,305\); males, \(n = 109, M = 32.9\) years old). Researchers examined potential moderators of quality of life, including gender, parenthood status, and recruitment location (online or face to face). Women displayed significantly lower scores \((M = 53.3; SD = 16.2)\) compared to men \((M = 72.1; SD = 14.7; t = 10.3, p < .001)\), and participants without children displayed lower scores \((M = 53.3; SD = 16.3)\) than participants with children \((M = 59.5; SD = 17.7; t = 5.27, p < .001)\). Also, participants recruited online had lower scores \((M = 50.7; SD = 15.1)\) than participants recruited face to face \((M = 67.8; SD = 15.6; t = 16.6, p < .001)\). In addition to testing for group differences amongst the potential moderators, the researchers conducted exploratory factor analysis to determine the factors. Results indicated that the FertiQol is a 26-item scale, with the inclusion of the two introductory items, in total comprising the “Core FertiQol” as Likert-type items (5-point) ranging from 0 (very poor) to 4 (very good) within four subscales or factors, (a) impact on emotions (e.g. causes sadness, resentment, grief) \((6\) items) \((M = 45.10; SD = 23.2)\) with a strong internal consistency of \(\alpha = .90\), (b) impact on mind-body (e.g. fatigue, pain, concentration, disrupted daily activities) \((6\) items) \((M = 54.86; SD = 21.2)\) with a good internal consistency of \(\alpha = .84\), (c) relational impact (e.g. sexuality, communication and commitment) \((6\) items) \((M = 68.70; SD = 19.2)\) with a good internal consistency of \(\alpha = .80\), and (d) social impact (e.g. social inclusion, expectations, and support) \((6\) items) \((M = 51.10; SD = 20.6)\) with an acceptable internal consistency of \(\alpha = .75\) (Boivin, Takefman, & Braverman, 2011). Also, results indicated that the emotional subscale explained the greatest portion of the
variance (37.8%). Overall, the assessment has a strong internal consistency of $\alpha = .92$ (Boivin et al., 2011).

Donarelli and colleagues (2016) also used the FertiQol in a study with 589 participants from an Italian community to investigate the validity of the relational subscale measure in men and women undergoing infertility treatment. The participants (females, $n = 301$; males, $n = 288$) completed the FertiQol assessment as well as other measures related to relationship satisfaction (Dyadic Adjustment Scale [DAS], Spanier, 1976; Marital Commitment Inventory [MCI], Stanley and Markman, 1992; ENRICH Marital Satisfaction Scale [EMS], Olson et al., 1987) and infertility distress (Fertility Problem Inventory [FPI], Newton et al., 1999). Results indicated through confirmatory factor analysis that the FertiQol four factor assessment was a good fit for the data ($X^2 = 746.862; df = 240; CFI = .914; GFI = .900; RMSEA = .060$). The discriminate validity of the relational subscale was acceptable. The women’s scores ($\alpha = .68$) displayed greater reliability than men ($\alpha = .61$), indicating acceptable reliability, and the relational subscale was significantly associated with two of the other relationship satisfaction measures (DAS, $r = .28, p < .01$; EMS, $r = .31, p < .01$). Overall, reliability of all four FertiQol subscales were good (mind-body, $\alpha = .83$; social, $\alpha = .70$; emotional, $\alpha = .83$; relational, $\alpha = .83$).

Maroufizadeh and colleagues (2018) conducted a correlational study to investigate the effects of depression (Patient Health Questionnaire-9 [PHQ-9]; Kroenke & Spitzer, 2002) on quality of life in couples with infertility ($N = 180$), using the FertiQol. The participants (male, $n = 180$; female, $n = 180$) were recruited from an Iranian fertility clinic. The researchers utilized dyadic analysis and found that both male and female depression scores had an actor effect on their own individual quality of life (male, $\beta = -0.589, p < 0.001$; female, $\beta = -0.588, p < 0.001$). Also, the husband’s level of depression had a significant partner effect on the wife’s
quality of life ($\beta = -0.128$, $p < 0.05$). Specifically, regarding the FertiQol, there were significant
difference between men and women ($t = 4.09$, $p < .001$), supporting that women tend to
experience lower quality of life. Also, there were differences found for the emotional (female, $M$
= 56.16; male, $M = 67.34$, $t = 5.68$, $p < .001$), mind-body (female, $M = 67.31$; male, $M = 74.07$, $t$
= 3.97, $p < .001$), and relational (female, $M = 77.08$; male, $M = 80.12$, $t = 2.18$, $p < .05$) factors.

Researchers also found a strong internal reliability for the FertiQol ($\alpha = .91$).

Koert, Takefman, and Boivin (2019) also conducted a systematic literature review to
update the research base on the effectiveness of the FertiQol in assessing fertility related quality
of life across multiple domains. Through extensive searching, the researchers reviewed 41
articles from different samples (35 independent samples, $N = 16,315$) found in different countries
($n = 23$). Confirmatory factor analysis revealed that internal reliability was good across all
studies (> .80), moreover, five studies consistently reported a strong reliability (> .90). Results
suggested construct and convergent validity was established as the FertiQol scores were
correlated with other measures in predictable ways, such as depression and the emotional
subscales was correlated, and higher anxiety has been associated with lower FertiQol scores. As a
whole, in tandem with Boivin and colleagues’ (2011) original findings, Donarelli and colleagues’
(2016) findings, Maroufizadeh and colleagues’ (2018) findings, and the findings of Koert,
Takefman, and Boivin (2019), the researcher identifies the FertiQol has valid and reliable scores
for use with a sample of infertile couples. This investigation will include the Core FertiQol as a
latent variable and the four anticipated composite scores as manifest variables, including: (a)
mind-body, (b) emotional, (c) social, and (d) relational (see Figure 1).
Relationship satisfaction is a construct identified as an important phenomenon in explaining the satisfaction that partners experience in a romantic relationship (Carlson et al., 2014; Funk & Rogge, 2007). The CSI has a 32-item, 16-item, and 4-item option. The 16-item scale will be used for this study. Specifically, the 16-item scale measures the single factor of relationship satisfaction and has been found to have a higher precision of measurement while still detecting variances in level of satisfaction (Funk & Rogge, 2007) (see Figure 3). This unidimensional scale measures relationship satisfaction by assessing the individual’s positive feelings towards their partner as well as towards the relationship. Example items include (a) “My
relationship with my partner makes me happy,” (b) “I really feel like part of a team with my partner,” and (c) “How well does your partner meet your needs?”

**Psychometric Properties of the CSI**

Funk and Rogge (2007) conducted a study to compare the CSI to other reliable measures of relationship satisfaction (*Marital Adjustment Test* [MAT], Locke & Wallace, 1959; *Dyadic Adjustment Scale* [DAS], Spanier, 1976) using item response theory (IRT) with participants online (*N* = 5,315). The CSI was primarily compared to the MAT and the DAS; however, the CSI was also compared to four other validated measures of relationship satisfaction (*Kansas Marital Satisfaction Scale* [KMS]; Schumm et al., 1983; *Quality of Marriage Index* [QMI], Norton, 1983; *Relationship Assessment Scale* [RAS], Hendrick, 1988; *Semantic Differential* [SMD], Karney & Bradbury, 1997) as well as 71 additional satisfaction related items from lesser known measures. The participants were mainly female (80%; *M* = 26 years old). The researchers utilized item response theory (IRT) as it is considered a valid methodology for creating standardized tests. In total, the researchers analyzed the 176 satisfaction items to create the CSI. Results indicated that the CSI (32) and CSI (16) provided the greatest amounts of satisfaction information compared to the other scales. The CSI (16) scale includes 16 Likert scale items (6-point) ranging from 0 (always disagree) to 5 (always agree) all measuring satisfaction in the relationship. The CSI (16) demonstrated strong internal reliability (*α* = .98) as well as an appropriate cutoff distress score (51.5) as the total possible score is 81. Additionally, the CSI had strong convergent validity with the other scales, demonstrating that the CSI accurately assesses the construct of relationship satisfaction (ranging from *r* = .85 to .98). Results from the IRT further demonstrated that the CSI had superior power and precision in measuring the construct.
Overall, this in-depth study supports the use of the CSI (16) in measuring the desired construct of relationship satisfaction.

Sultan and colleagues (2018) conducted a correlational study to assess social support and relationship satisfaction using the CSI-16, among infertile and fertile women ($N = 177$). The participants disclosed their type of infertility (fertile, $n = 55$; primary infertility, $n = 55$; secondary infertility, $n = 67$). The CSI demonstrated strong internal consistency ($\alpha = .97$), supporting the use of the measure amongst the specific population of individuals with infertility. The CSI items were able to distinguish that levels of relationship satisfaction are different between fertile and infertile women, as well as between women with primary infertility and secondary infertility ($F = 9.104, p < .001$). Hence, this study indicates that the CSI is a reliable measure of relationship satisfaction related to infertility.

Okhotnikov and Wood (2020) examined the 16-item version of the CSI as they adapted it into Russian and tested the version on adult individuals ($N = 406$). Results indicated that the CSI demonstrated strong internal consistency in both men ($n = 160, M = 64.50, SD = 14.43, \alpha = .97$) and women ($n = 246, M = 59.87, SD = 17.83, \alpha = .98$). Convergent validity was demonstrated by assessing the correlation between the CSI and Aleshina’s Satisfaction with Marriage Test (SMT; Aleshina et al. 1987) ($r = .79, p < .001$). Hence, the CSI-16 was a reliable and valid measure when translated into Russian, supporting the already known reliability from the original scale development.

Lamela and colleagues (2020) examined the CSI factor structure in Portuguese women ($N = 891, M = 39.8$ years old) with clinical depression (Patient Health Questionnaire-9 [PHQ-9], Kroenke et al., 2001). Confirmatory factor analysis confirmed that there was only one factor for the measure, the factor fit the data well (CFI = .99, RMSEA = .028, SRMR = .004), and factor
loadings were all within appropriate range (.65 to .96). Overall, the results indicated a strong internal consistency (α = .91). The researchers’ findings indicate that the CSI produced similar response patterns across multiple depression groups (no depression, α = .92; depression, α = .90). The results from this study support the CSI has valid and reliable scores in various cultures, especially when measured in relation to other relevant constructs, such as depression. As a whole, in tandem with Funk and Rogge’s (2007) original findings, Sultan and colleagues’ (2018) findings, Okhotnikov and Wood’s (2020) findings, and the findings of Lamela and colleagues (2020), the current researcher identifies the CSI (16) has valid and reliable scores, with one factor, for use in adults with infertility (see Figure 3).

![Figure 3. Anticipated Measurement Model of CSI](image)
Connor–Davidson Resilience Scale (CD-RISC)

Resilience is a construct that has been long studied amongst various populations that have experienced adversity or stressful life events (Campbell-Sills & Stein, 2007), including chronic health conditions. Resilience is an important construct to consider when evaluating the impact of infertility on a couple, as resilience is hypothesized to act as a protective in couples experiencing infertility. The CD-RISC was originally constructed as a 25-item scale but was modified to a 10-item scale after further investigation into psychometrics and factor presence (see Figure 4). The CD-RISC consists of 10 items that are all related to one’s ability to adapt to adverse life stressors. Participants rank how true each item feels for themselves on a scale of 0 (not true at all) to 4 (true nearly all the time). Example items include: (a) “Can deal with whatever comes,” (b) “Tend to bounce back after illness or hardship,” and (c) “Not easily discouraged by failure.”

Psychometric Properties of the CD-RISC

Campbell-Sills and Stein (2007) conducted a study to test the CD-RISC with three separate samples (N = 1,743) on a college campus. The first (n = 511) and second (n = 512) samples’ results were used for exploratory factor analysis (EFA) of the 25-item scale. The first EFA identified a four-factor model with good fit ($\chi^2 = 424.09, p < .001; \text{RMSEA} = .046$). Also, the second EFA identified a four-factor model with good fit ($\chi^2 = 453.36, p < .001; \text{RMSEA} = .048$); however, both EFAs illustrated salient factor loadings without a definitive model structure.

The 25-item scale had various items with inconsistent loadings between the two EFAs, factors that consisted of only a couple items, and a factor that seemed to encompass two different constructs. Hence, the authors conducted further investigation into the 25-item scale and found the presence of two factors (i.e., hardiness and persistence) with adequate internal consistency.
Although the fit indices identified an adequate model ($\chi^2 = 167.30, p < .001; \text{CFI} = .96; \text{RMSEA} = .055; \text{SRMR} = .037$), there was poor discriminant validity within the instrument indicating that several items highly correlated with each other ($r = .81$). Hence, the authors removed the items that appeared to highly correlate and load on multiple factors. After re-fitting the model, the authors found a unidimensional 10-item scale. The CD-RISC 10-item scale measures an individual’s ability to adapt when faced with adversity (Campbell-Sills & Stein, 2007). The CD-RISC includes 10 Likert-type items (5-point) ranging from 0 (not true at all) to 4 (true nearly all the time). The CD-RISC scores demonstrate positive psychometric properties with a good internal consistency of $\alpha = .86$ (Campbell-Sills & Stein, 2007).

Li and colleagues (2019) conducted a cross-sectional survey research study to investigate the moderating role of resilience (Conner-Davidson Resilience Scale [CD-RISC]; Campbell-sills and Stein 2007) and marital satisfaction (Dyadic Adjustment Scale [DAS-7]; Hunsley et al., 2001) on infertility distress (Fertility Problem Inventory [FPI]; Newton et al., 1999) in Chinese women ($N = 466$). All participants were married and recruited from maternal health hospitals in China. General results indicated that marital satisfaction and resilience were significant moderators for direct and indirect effects of infertility stress on life satisfaction (marital satisfaction, $SE = .11, p < .001$; resilience, $SE = .12, p < .01$). Hence, resilience plays a role in how significantly infertility stress impacts overall satisfaction and the CD-RISC 10-item scale is an appropriate measure to use in association with relationship satisfaction. Specifically, in this study, the results from the CD-RISC were found to have an impact on infertility life domains ($SE = .08, p < .05$).

Hebert and colleagues (2019) conducted a study to validate the CD-RISC 10-item scale in a cross-cultural setting with Canadian women ($N = 784, M = 25.32$ years old). The researchers
reported the participant average score ($M = 26.62$), which was similar to the average score obtained in Cambell-Sills and Stein’s (2007) original study ($M = 27.21$) as well as other studies (Notario-Pacheco et al., 2011; $M = 27.41$) demonstrating that participants from various cultural backgrounds still score similarly. Bartlett’s (1954) test of sphericity indicated significant factors in the correlation matrix ($Bartlett = 2,299.718, p < .001$). Additionally, all items displayed good factor loadings. Additionally, the researchers utilized confirmatory factor analysis to test how well the model fit the data and found a very good fit ($\chi^2 = 86.90, p < .001$, CFI = .97, RMSEA = .044) as well as good internal reliability ($\alpha = .86$). Pearson correlations between the CD-RISC and the fit indices indicated strong construct validity (> .50) as resilience items negatively correlated anxiety and depression, supporting CD-RISC use when also measuring depression.

Windle and colleagues (2011) conducted a methodological review of various resilience scales in the literature to determine the best scales with the strongest psychometrics. The researchers reviewed multiple peer reviewed articles ($k = 38$) that addressed seventeen different resilience scales. Also, systematic principles according to quantitative methodological review were employed. The principles include: (a) content validity, (b) internal reliability, (c) criterion validity, and (d) construct validity. Overall, the CD-RISC 10-item scale was in the top three for strong psychometrics. The researchers did not report specific details; however, they scored the CD-RISC using the systematic principles. Overall, according to the scoring, CD-RISC had good internal reliability, achieved the highest maximum score for construct validity compared to other resilience scales, had the highest score for test-re-test (.87), and had the strongest responsiveness to clinical treatment. As a whole, in tandem Hebert and colleagues’ (2019) findings, Campbell-Sills and Stein’s (2007) findings, Li and colleagues’ (2019) findings, and Hebert and colleagues’
(2019) findings, the researcher identifies the CD-RISC 10-item scale as a valid and reliable measure for use in couples with infertility.

Figure 4. Anticipated Measurement Model of CD-RISC

PROMIS Depression Inventory

PROMIS health organization is responsible for designing over 300 measures with valid and reliable scores to assess social, mental, and physical health (www.healthmeasures.net). PROMIS measures are designed as large question banks where all items have been repeatedly validated and then systematically organized into short forms and brief assessments. A benefit of PROMIS measures is that due to the short length of the assessment, while still maintaining strong psychometrics, participants experience less exhaustion when completing the forms. PROMIS measures can assess various emotional experiences, such as depression, through several different forms, allowing the researcher to select the questions that seem most appropriate for the study population.
The PROMIS Depression measure is based on the U.S. general population, corresponding to the normal distributions of gender, age, race, and education according to the 2000 U.S. Census (Liu et al., 2010). This investigation seeks to use the PROMIS Depression- short form 8a, which measures an individual’s level of depression in the past seven days. The PROMIS depression scale examines the following domains: (a) negative mood (e.g., sadness, guilt), (b) lack of positive affect (e.g., loss of interest), (c) information-processing issues (e.g., difficulty decision-making), (d) negative view of self (e.g., self-criticism, worthlessness), and (e) negative social experiences (e.g., loneliness, interpersonal alienation). For the purpose of this current study, the form will be adapted to ask the participants to think back to infertility challenges. The PROMIS Depression Instrument includes 8 Likert-type items (5-point) where participants rates how often they experience the statement, ranging from 1 (never) to 5 (always) Example items include: (a) “I felt worthless,” (b) “I felt like a failure,” (c) “I felt hopeless,”, and (d) “I felt that I had nothing to look forward to” (see Figure 5).

**Psychometric Properties of the PROMIS Depression**

The PROMIS Depression Instrument, short form 8a, was validated by the PROMIS Health Organization through rigorous testing (N = 782). The PROMIS Health Organization indicated that the depression 8a short form had strong consistency (\( \alpha = .98 \)), with a mean score of \( M = 49.16 \).

Cella and colleagues (2010) conducted a study utilizing item response theory (IRT) to examine the psychometrics of the PROMIS item pools in individuals from the United States (N = 21,133). Item development by PROMIS Health Organization occurred through the following six phases: (a) identification of existing items, (b) item classification and selection, (c) item review and revision, (d) focus group input on domain coverage, (e) cognitive interviews with individual
items, and (f) final revision before field testing. The authors assessed large data sets \((n = 11)\) that assessed domains, including the depression measure. Results indicated that the analysis supported the use of the 11-item bank that would inform various short forms. Specifically, the depression item bank resulted in a strong reliability \((\alpha = .93)\) as well as evidence of validity based on Pearson correlations between depression, anxiety \((r = .81)\), and anger \((r = .60)\). Overall, this study supports the validity and reliability of the PROMIS depression short form, especially when assessing individuals with chronic health conditions.

Choi and colleagues (2017) conducted a study utilizing item response theory to establish a common metric for depression in the PROMIS depression scale. The researchers produced correlation table linking three of the most popular depression measures and corresponding studies to the PROMIS depression scale (Cella et al., 2010; \(N = 21,133\)): (a) the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977; \(N = 747\)), (b) the Beck Depression Inventory–II (BDI-II; Beck et al., 1996; \(N = 748\)), and (c) Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001; \(N = 1,120\)). The researchers utilized small sample subset to establish confidence intervals for the differences between the linked scores as well as to identify correlations between the three popular measures and the PROMIS depression scale. The PROMIS depression scale yielded the highest internal consistency \((\alpha = .98)\). Also, confirmatory factor analysis (CFA) was utilized between the PROMIS depression scale and each of the three depression scales to test for overall unidimensional fit. The following results of the CFAs indicated good fit: (a) PROMIS depression and CES-D \((\text{CFI} = 0.960; \text{RMSEA} = 0.068)\), (b) PROMIS depression and BDI-II \((\text{CFI} = 0.975; \text{RMSEA} = 0.077)\), and (c) PROMIS depression and PHQ-9 \((\text{CFI} = 0.977; \text{RMSEA} = 0.087)\). Next, the researcher conducted IRT and found that the cross-walk scores were good. The results of this study indicate the PROMIS depression scale
has valid and reliable scores that can be utilized as a single measurement tool for depression. Hence, data from the three popular depression instruments can be retroactively fitted to the PROMIS depression scale. Overall, the results from this study support the PROMIS depression scale as a valid measurement tool in assessing depression across multiple demographics and populations. As whole, alongside Choi and colleagues’ (2017) findings, Cella and colleagues’ (2010), and the findings provided by the PROMIS Health Organization, the researcher identifies the PROMIS depression scale has valid and reliable scores for use with couple experiencing chronic health conditions.

![Figure 5. Anticipated Measurement Model of PROMIS](image)

**The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale (FSCRS)**

Internalized shame is a construct identified by researchers as a form of trait shame, which persists in an individual’s view of self (Cook, 1988, 2001; Rosario & White, 2006). Considering that shame of the self is an important phenomenon many individuals experience regarding infertility, it is valuable to measure these levels of shame.

The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale is a 22-item, three factor, scale measuring self-reported feelings of internal shame, such as self-hatred and feelings
of inadequacy, as well as the ability to self-reassure (Gilbert et al., 2004). The FSCRS is a Likert-type scale (5-point) ranging from 0 (Not At All Like Me) to 4 (Extremely Like Me), with three factors, (a) Inadequate Self with a strong internal consistency of $\alpha = .90$, (b) Hated Self with a good internal consistency of $\alpha = .86$, and (c) Reassured Self with a strong internal consistency of $\alpha = .86$ (Gilbert et al., 2004). The first factor, inadequate self, consists of nine items. An example item includes, “There is a part of me that feels I am not good enough.” The second factor, hated self, consists of five items. An example item includes, “I have a sense of disgust with myself.” The third factor, reassured self, consists of eight items. An example item includes, “I can still feel lovable and acceptable.” Originally, the FSCRS creator designed the instrument to measure the impact of self-criticism on shame, self-hatred, and the ability to offer oneself self-reassurance. The instrument has been used with various populations (Gilbert et al., 2004).

**Psychometric Properties of the FSCRS**

Gilbert and colleagues (2004) conducted a study to develop the FSCRS by testing statements that the researchers heard their depressed clients, struggling with self-criticism, say about themselves. Originally, the scale consisted of 24 items that participants would rate. After analysis, the researchers removed two items that did not fit the model. After several rounds of testing the scale, the authors finalized a 22-item scale, with three factors, to measure shame, including feelings of inadequacy and self-hatred, and ability to offer oneself self-reassurance. Further, the authors examined the psychometrics of the FSCRS in a sample of female undergraduate students ($N = 246$, $M = 27.7$ years old). The participants completed the following self-report scales at the start of a class lecture: (a) *Centre for epidemiological studies depression scale* (CES-D; Radloff, 1977), (b) *Levels of self-criticism scale* (LOSC; Thompson & Zuroff, 2000), and (c) *Forms of self-criticizing/attacking and self-reassuring scale* (FSCRS). Results
indicated that the following three factors found in the shame scale had strong internal consistency: (a) inadequate self factor (α = .90), (b) hated self factor (α = .86), and (c) reassured self factor (α = .86). Additionally, the authors found appropriate construct validity amongst depression, shame, and self-criticism. Overall, the FSCRS has valid and reliable scores making it a strong instrument in the measure of shame.

Baiao and colleagues (2015) conducted a meta-analysis to examine the psychometric properties of the FSCRS among twelve different studies with both nonclinical participants (n = 887; males, n = 210; females, n = 676; M = 24.13 years old) and clinical participants (n = 167). The clinical participants mostly had a diagnosis of depression (58.48%). The authors conducted confirmatory factor analysis to assess the psychometrics of the FSCRS. Results indicated strong internal consistency for all three factors in both the clinical and nonclinical groups: (a) inadequate self (clinical, α = .91; nonclinical, α = .90), (b) hated self (clinical, α = .87; nonclinical, α = .85), and (c) reassured self (clinical, α = .85; nonclinical, α = .85). Additionally, all items displayed good factor loadings and the model fit the data well (CFI = .936, RMSEA = .061, TLI = .929). Lastly, the authors found good construct validity and discriminant validity between the factors.

Halamova (2018) conducted a study to examine the factor structure of the FSCRS across thirteen nonclinical samples (N = 7510) among twelve different countries. Australia (N = 319), Canada (N = 383), Switzerland (N = 230), Israel (N = 476), Italy (N = 389), Japan (N = 264), the Netherlands (N = 360), Portugal (N = 764), Slovakia (N = 1326), Taiwan (N = 417), the United Kingdom one (N = 1570), the United Kingdom two (N = 883), and USA (N = 331). Data analysis included Item Response Theory (IRT) to assess the FSCRS. All three factor scales demonstrated strong internal consistency across all samples: Australia (α = .95), Canada (α = .92), Switzerland
(α = .95), Israel (α = .90), Italy (α = .92), Japan (α = .90), the Netherlands (α = .91), Portugal (α = .92), Slovakia (α = .90), Taiwan (α = .93), the United Kingdom one (α = .94), the United Kingdom two (α = .93), and USA (α = .93). The results also indicated good model fit across all samples, however, considering the current study took place in the United States, only this sample is reported (CFI = .93; TLI = .92; RMSEA = .062; SRMR = .07). The authors also found strong validity for the items compared to other scales measuring similar constructs. Lastly, the authors support Gilbert et al. (2004) in his suggestion to only use the subscale totals, rather than the whole scale total score. As a whole, in tandem with Gilbert et al. (2004) original findings, Baiao et al. (2015) findings, and the findings of Halamova and colleagues (2018), the researcher identifies the FSCRS has valid and reliable scores in the measure of shame.

Figure 6. Anticipated Measurement Model of FSCRS
Research Hypothesis and Exploratory Questions

The aim of this investigation was to assess the association of fertility related quality of life in couples with infertility on both partners’ relationship satisfaction, resilience, depression, and shame. The primary research hypothesis and the exploratory research question are below.

Research Hypothesis

The research hypothesis for this current study was: Couples experiencing infertility with higher levels of fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]) will have increased relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), increased resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), decreased depression (as measure by the PROMIS Depression Instrument [Cella et al., 2010]), and decreased shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004]) with gender as a covariate (see Figure 7).

Research Question

To what extent does fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]) effect relationship satisfaction (as measured by the Couple Satisfaction Index [Campbell-Sills & Stein, 2007]), depression (as measure by the PROMIS Depression Instrument [Cella et al., 2010]), and shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004]).
Figure 7. Hypothesized Structural Model

Exploratory Research Question 1

What are the actor and partner effects amongst couples’ fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]), relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), depression (as measured by the PROMIS Depression Instrument [Cella et al., 2010]), and shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al., 2004])?

Exploratory Research Question 2a

What are the relationships among the demographic variables (i.e., gender, race, ethnicity, education, income, relationship length, infertility length, type of infertility, cause of infertility, and the scale questions including treatment access and the individual’s value of spirituality) and (a) fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin, Takefman, & Braverman, 2011]), (b) relationship satisfaction (as measured by the Couple
Satisfaction Index [Funk & Rogge, 2007]), (c) resilience (as measured by the Connors-Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), (d) depression (as measured by the PROMIS Depression Instrument [Cella et al., 2010]), and (e) shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004])?

**Exploratory Research Question 2b**

What is the relationship between couples’ race and (a) fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]), (b) relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), (c) resilience (as measured by the Connors-Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), (d) depression (as measured by the PROMIS Depression Instrument [Cella et al., 2010]), and (e) shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004])?

**Dependent and Independent Variables**

This investigation utilized several dependent (i.e. endogenous) variables and a primary independent (i.e. exogenous) variable to analyze the theoretical structural model. In SEM, (Kline, 2016) the independent variables and dependent variables display the variable relationships in a path diagram. In APIM (Kenny et al., 2006) the path diagram displays how one partner’s independent variable effects their own dependent (i.e. outcome) variable (i.e., actor effect), as well as how one partner’s independent variable effects the other partner’s dependent (i.e. outcome) variable (i.e., partner effect).
Dependent/Endogenous Variable

This study explored the relationships between fertility related quality of life, relationship satisfaction, resilience, depression, and shame. After a thorough review of the literature, the researcher selected the following dependent variables as constructs of interests: (a) relationship satisfaction, (b) resilience, (c) depression, and (d) shame.

1. Relationship satisfaction is a latent variable (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]) represented by a singular manifest variable of total scale score. After a thorough review of the literature, the researcher identified that couples with infertility tend to display lower levels of relationship satisfaction (Greil et al., 2018; Sultan et al., 2018).

2. Resilience is a latent variable (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]) represented by a singular manifest variable of total scale score. After a thorough review of the literature, the researcher identified that resilience is associated with quality of life and depression, especially when the individual is facing an adverse life event (Hermann et al., 2011; Li et al., 2020).

3. Depression is a latent variable (as measured by the PROMIS Depression Instrument [PROMIS Depression; Cella et al., 2010]), represented by a singular manifest variable of total scale score. After a thorough review of the literature, the researcher identified that individuals and couples with infertility tend to experience greater levels of depression (Maroufizadeh et al., 2020).

4. Shame is a latent variable (as measured by the The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004]), represented by three manifest variables (a) *inferiority*, (b) *fragility*, and (c) *emptiness and loneliness*. 
After a thorough review of the literature, the researcher identified that individuals with infertility experience greater levels of internalized shame (Ceballo et al., 2015; Taylor, 2018).

**Independent/Exogenous Variables**

Based on a review of the literature, which indicates that fertility distress impacts fertility related quality of life, which in turn effects relationship satisfaction, resilience, depression, and shame; the researcher selected the following independent and exogenous variables: (a) fertility related quality of life, and (b) demographic variables.

1. Fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]), is a latent construct represented by four manifest variables (a) mind-body, (b) emotional, (c) social, and (d) relational domains. After a thorough review of the literature, the researcher identified that fertility related quality of life is associated with relationship satisfaction, resilience, depression, and shame (Greil et al., 2018; Kim et al., 2018; Wood et al., 2017; Zurlo et al., 2018).

2. Demographic variables of couples with infertility that will also be independent variables include: (a) age, (b) identified gender, (c) ethnicity, (d) race, (d) education, (e) household income, (f) rural or urban living, (g) employment status, (h) geographic location, (i) relationship status, (j) length of relationship, (k) length of time experiencing self-identified infertility, (l) type of infertility, (m) cause of infertility, (n) if the couple has sought professional help for their relationship (mental health, marriage and family, psychology), and (o) if the couple has sought medical help for infertility.
Data Analysis Plan

The researcher collected the data utilized for this research study from an electronic survey hosted on Qualtrics, which included the General Demographic Form as well as following five assessment instruments: (a) FertiQol (Boivin et al., 2011), (b) CSI (Funk & Rogge, 2007), (c) CD-RISC (Campbell-Sills & Stein, 2007), (d) PROMIS depression (Cella et al., 2010), and (e) FSCRS (Gilbert et al., 2004). Following data collection, the researcher imported all data into the Statistical Package for Social Science (SPSS; Version 25.0). Data analysis included (a) preliminary analysis, (b) the reorganization of data with a dyadic structure, (c) testing the measurement models, (d) SEM, and (e) SEM to estimate the Actor-Partner Interdependence model (APIM). Preliminary analysis included cleaning the data, testing assumptions, and running descriptive statistics. Next, the data was re-organized into a dyadic structure to allow for the examination of interdependence in constructs between members of a dyad. Lastly, SEM estimation and the APIM model was assessed through MPLUS (MPLUS; Version 6.11) to test the hypothesized relationships among the study variables of fertility related quality of life, relationship satisfaction, resilience, depression, and shame.

Preliminary Analysis

Prior to conducting SEM analysis, all data was screened, cleaned, and missing data was addressed (Hahs-Vaughn, 2017). Hahs-Vaughn (2017) provided recommended steps for screening data, which include: (a) descriptive statistics and distribution checks to search for ranges, missing values, and univariate outliers; (b) scatterplots, Q-Q plots, and regressions to examine linearity, normality, and residuals; (c) use of transformation to correct violations to assumptions; (d) assess and address missing data; (e) run a regression to examine Mahalanobis distance and multivariate outliers; (f) delete or transform any extreme outliers; and, (g) evaluate
multicollinearity through running several multiple regression models for each variable, treating each variable as the dependent variable, with all other variables are treated as independent variables. Specifically, assessing missing data involves determining which of the following reasons the data is missing: (a) missing completely at random (MCAR), meaning that at the missing data are unrelated to other data and the variable itself, (b) missing at random (MAR), meaning that the missing data does not depend on the variable itself but may be related to other variables, and (c) non-ignorable data, meaning data is missing due to a bias response (Schumacker & Lomax, 2016). Further, best practice for missing data is to conduct multiple data imputation, where the statistical program estimates and replaces missing data, considering deleting cases could affect sample size and removes other valuable data relate to the deleted case (Schumacker & Lomax, 2016). However, the current investigation did not have any missing data due to the designation of forced response items on the survey. Also, regarding extreme outliers, scores beyond three standard deviations from the mean, the researcher can delete the outlier if the outlier does not belong in the population (i.e., a couple without infertility), or transform the outlier according to the normal theory method, where the researcher defaults maximum likelihood (ML) requiring all data to be normally distributed. However, there were no extreme outliers in the current study.

Further, there are several assumptions that must be met for SEM analysis: (a) multivariate normality, (b) linearity, (c) absence of multicollinearity, and (d) small residuals close to zero (Kline, 2016). Once the general assumptions have been met by conducting preliminary analysis and data cleaning and screening, the SEM procedure may begin to test the relationship among the latent constructs and to estimate the APIM model.
**Structural Equation Modeling**

SEM is an advanced form of statistical analysis that encompasses multiple regression, confirmatory factor analysis, and path analysis to test and identify a proposed theoretical model. Fundamentally, SEM analysis tests multiple relationships between multiple observed variables (i.e., manifest variables), and constructs (i.e., latent variables) through hypothesis testing with the purpose of identifying a specific model. Moreover, SEM is the most effective way to estimate an APIM model as it allows for direct and indirect effects to be assessed simultaneously, as opposed to running multiple analyses per effect. Hence, SEM offers advantages to other statistical analysis where there is more variable restriction. A primary goal of SEM is to analyze covariance amongst the variables and then illustrate the covariance in the hypothesized model (Kline, 2016). Consequently, directionality amongst variable relationships can be cautiously interpreted.

This investigation used SEM to test a theoretical model, which consists of both observable (i.e., manifest variables), and latent constructs. Manifest variables are the measured data acquired from the assessment instruments and can be utilized as observable indicators of a more abstract unmeasurable construct. Also, manifest variables can be measured as categorical or continuous. In the path model figures provided, the manifest variables are illustrated with rectangles. Alternatively, latent variables represent the larger, more abstract construct being assessed (i.e., fertility related quality of life) that cannot be directly observed. In the path model figures provided, latent variables are illustrated by ellipses. In this particular study, the researcher used the hypothesized model to examine the relationships between the latent constructs (fertility related quality of life, relationship satisfaction, resilience, depression, and shame) and the observable variables (FertiQol, CSI, CD-RISC, PROMIS depression, and FSCRS) and a covariate (gender). In the path model figures, the arrows represent the directional relationship
between variables, meaning that the independent variable (i.e., exogenous or predictor variable) points towards the dependent (i.e., endogenous or outcome) variable. Hypothetically, if there is covariance identified between two variables, then that would be illustrated by a bi-directional arrow. Lastly, there are two main model types in SEM: (a) the measurement model, which identifies the relationship between manifest variables to latent variables, and (b) the structural model, which identifies the relationships between the latent constructs.

SEM procedure requires the following five steps: (Crockett, 2012; Kline, 2016); (a) model specification, (b) model identification, (c) model estimation, (e) model testing, and (f) model modification. The following section outlines the main steps in SEM, the main steps and assumptions associated with APIM, as well as the secondary analyses that will be utilized in this investigation.

Covariate

A covariate is a variable that can bias the results of the path analysis if not controlled (Bollen & Bauldry, 2011). Covariates are not measures of a latent variable, but rather associated with the latent variables and the manifest variables as a way to further explain the relationship between latent and manifest variables (Bollen & Bauldry, 2011). Further, exclusion of a covariate which increase bias in the results between the latent variables and the indicators (Bollen & Bauldry, 2011). Hence, it is necessary to control for a covariate in SEM. In SEM analysis, the researcher can: (a) consider the covariate as a causal factor for the latent variable, or (b) handle the covariate as a correlated variable with the latent variable, which is a preferred method (Bollen & Bauldry, 2011). In this current study, gender would be considered the covariate, as previous studies have identified that there are gender differences in how individuals are impacted by infertility distress (Donarelli et al., 2016).
Steps in SEM

Model Specification. The first step in SEM is model specification, which will take place prior to data analysis. In this step, the researcher will create a hypothesized theoretical model of relationships between the constructs and illustrate this model in the form of a path diagram (Kline, 2016; Schumaker & Lomax, 2016). Path models, in model specification perform two functions: (a) to illustrate the structural model (i.e., inner model), which identifies the relationships between the latent constructs (see Figure 7), and (b) to illustrate the measurement model (i.e., outer model), which identifies the relationship between manifest variables to latent variables (Kline, 2016) (see Figures 2-6). The path diagram illustrated the independent variable on the left and the dependent variable on the right. In developing the theoretical model, the researcher must rely on theory to support the hypothesized relationship between variables (see Chapter 2). SEM relies on measurement theory to support the measurement model (Kline, 2016).

Model Identification. In order for the SEM analysis to be successful, the primary rule of identification must be met. Identification is achieved when it is “theoretically possible” for the statistics software to derive an estimate of each model parameter (Kline, 2016). Considering identification is related to the theory, it is an aspect of the model and not the actual data. Further, identification is not dictated by sample size or elements of the data, but rather how the data is arranged in the theoretical model. Hence, if identification is not met, then the researcher will return to step one to re-specify the model. A model is identified when the degrees of freedom is greater than or equal to 1. The model should be theoretically supported to create a unique estimate for each parameter and requires for the parameters to be identified as free, fixed, or constrained (Crockett, 2012; Schumacker & Lomax, 2016). Free parameters are unknown and need to be estimated. Fixed parameters must set to a specific value (i.e., often a 0 or 1), and
constrained parameters are unknown, but controlled to equal one or more (Crocket, 2012).

Further, the researcher will need to identify the measurement model, through confirmatory factor analysis, prior to the structural model. A measurement model is likely identified when it is comprised of the following characteristics: (a) two or more latent variables, (b) the latent variables each have at least two observed variables that load on to it, (c) the errors of the indicators are uncorrelated, and (d) each indicator only loads on one factor (O’Brian, 1994). As of yet, the variables for this study contain the required characteristics.

Upon identifying the measurement model, the researcher then identified the structural model, which illustrates the relationships between the latent variables. The structural model is theoretically constructed based off the relationships between the constructs found in the literature. Identification of the structural model results from each latent variable’s relationship being tested. According to Crocket (2012), using Bollen’s (1989) recursive rule is an effective way to identify the structural model. A recursive structural model occurs when all the relationships specified by the model are unidirectional and not reciprocally related (Schumacker & Lomax, 2016).

**Model Estimation.** The primary purpose of model estimation is to determine if the model appropriately fits the data using statistical software (Kline, 2016). Model estimation involves the following: (a) evaluate how well the model fits the data according to the fit indices, (b) analyze the parameter estimates, and (c) consider any equivalent models. Once the researcher assesses the initial fit indices, it will likely be necessary to return to previous steps to reconfigure the model. Once the model appropriately fits the data, the researcher can move on to analyzing the parameter estimate. Additionally, in assessing equivalent models, the researcher can rearrange the direction of the data to assess if there are any contradictory models that also fit the
data. Once the researcher has determined the equivalent models, likely there will be several, the researcher can then intentionally decide which model to choose that best supports the theoretical structure. Parameter estimation methods typically include maximum likelihood (ML) and generalized least squares (GLS). ML is the most common parameter estimate because it does not need to meet parametric assumptions, yet still produces very strong estimates. Specifically, with small or medium sample sizes, or in the case of non-normal data, an additional method would be to apply the Santorra-Bentler or maximum likelihood robust (MLR) estimation (Kline, 2016).

**Model Testing.** Model testing involves testing the fit of the estimated model by achieving a non-significant chi-square statistic ($\chi^2$), and by assessing the following fit indices: (a) Comparative Fit Index (CFI; Bentler, 1990), (b) Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), (c) Root Mean Square Error of Approximation (RMSEA; Steiger, 1990), and (d) the Standardized Root Mean Square Residual (SRMR; Joreskog & Sorbom, 1988). Table 1 presents the referential values associated with each fit index. Although Chi-Square statistics are considered the true indicator of model fit, the statistic is sensitive to larger sample sizes, so other fit indices are included when determining model fit (Byrne, 2010).
### Table 1.

**Model Testing Fit Indices**

<table>
<thead>
<tr>
<th>Indices</th>
<th>Description</th>
<th>Referential Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square ($\chi^2$)</td>
<td>Assess overall fit and the discrepancy between the sample and fitted covariance matrices.</td>
<td>If $\chi^2$ is not significant, the model is acceptable.</td>
</tr>
<tr>
<td>Relative Chi-Square ($\chi^2$/df)</td>
<td>This value equals the chi-square index divided by the degrees of freedom.</td>
<td>The ratio of $\chi^2$ to df should be $\leq 2$ or $\leq 3$</td>
</tr>
<tr>
<td>Comparative Fit Index (CFI)</td>
<td>Compares the fit of a target model to the fit of an independent, or null model.</td>
<td>$&gt; .90$ is acceptable; $\geq 0.95$ is a good fit.</td>
</tr>
<tr>
<td>Tucker Lewis Index (TLI)</td>
<td>Represents an incremental fit measure.</td>
<td>$&gt; .90$ is acceptable; $\geq 0.95$ is a good fit.</td>
</tr>
<tr>
<td>Root Mean Squared Error of</td>
<td>The difference between the observed covariance matrix per degree of freedom and the hypothesized covariance matrix.</td>
<td>$0.05 - 0.08$ is acceptable; $\leq 0.05$ is a good fit.</td>
</tr>
<tr>
<td>Approximation (RMSEA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standardized Root Mean Square Residual (SRMR)</td>
<td>The average of standardized residuals between the observed and the hypothesized covariance matrices.</td>
<td>$0.05 - 0.08$ is acceptable; $\leq 0.05$ is a good fit.</td>
</tr>
</tbody>
</table>


**Model Modification.** In this final step, the researcher modifies the model to achieve optimal fit. To identify a superior fit to the data, the researcher can assess: (a) residual values in the residual matrix, (b) modification indices and, (c) theory to make adjustments to the structural model. Unless theory dictates, it is generally discouraged for the researcher to add or delete a path from the structural model. Hence, the researcher can adjust the model by adding error covariance between manifest variables. Nonetheless, it is possible that the structural model does not fit the data well, meaning that the theory did not support the results (Schumacker & Lomax, 2016).
Exploratory Research Question One

The first exploratory research question involved the use of dyadic data, where the couple is the unit of analysis. APIM was used to test the actor and partner effects in couples experience infertility to examine how one partner’s scores may influence the other partner’s scores. The following section includes an explanation on the use of dyadic data as well as an overview of the Actor-Partner Interdependence Model.

Dyadic Data

Traditionally, research is conducted with independent observations, meaning that there is no commonality between observations or influence of one observation on another. Rather, independent observations mean that respondent data can be analyzed completely separate from other data. However, research conducted in the social sciences theoretically suggests that relationships influence all individuals involved, and you cannot separate the individual from the interpersonal context. Hence, independence of observations may not be appropriate when examining relational phenomena, a term called “Pseudo-unilaterality” where the research makes the mistake of assuming that an assessment refers to only one individual in a social context (Kenny et al., 2006). Considering the influence of relational phenomena on the individual, it is necessary to assess the contributions of both individuals, resulting in dyadic data. Simply, dyadic data is a unit of analysis where both individuals in a relationship are assessed in relation to each other. Also, considering this study will utilize dyadic analysis to understand the influence of partners in a couple, those are the terms that will be used. Individual observations may be linked to other members in the individual’s social context through: (a) common fate, which the dyad experiences the same causal event; (b) mutual influence, which means both partners experience reciprocal effects where their outcome affect each other; and (c) compositional effect, which
means that both members share some commonality prior to engaging in the study. Although many studies examine interpersonal factors by assessing each individual separately, dyadic analysis allows for the unique opportunity to assess the data with the understanding that the data may be linked in each dyad. Moreover, dyadic data uniquely addresses how one partner in the couple affects the other partner’s outcome scores (i.e., a partner effect) (Kenny et al., 2006).

In a dyad, considering each member is influenced by the other, there is the assumption of non-independence (Kenny et al., 2006). For example, the presence of a partner effect is evidence of non-independence, as each partner’s observation is not independent from the other. Dyadic data analysis begins with the assessment of non-independence, with consideration to distinguishability. Distinguishability refers to a meaningfully identifiable factor that separates each partner in some way (i.e., gender, patient). Distinguishability can be assessed via an omnibus test analyzing if: (a) the means for the two members is the same for each variable, (b) the variances for the two members is the same for each variable, and (c) the intrapersonal and interpersonal correlations are the same for each pair of variables. For this particular study, the researcher will use gender as the distinguishable factor. Further, with the consideration of distinguishability, non-independence can be assessed through a Pearson product-moment correlation that does the following: (a) identifies the correlation coefficient for the dyad, while controlling for the mean differences, (b) identifies the confidence intervals for r, (c) controls for various independent variables with partial correlations (Kenny et al., 2006). Lastly, data will need to be reformatted into a dyadic structure, as analysis depends on the dyad as the unit of measurement. Hence, each line in the dataset is for one dyad that includes each partner’s information side by side (one partner’s score is X1, and the other partner’s score is Y1) as well as identifies common factors (i.e., length of relationship; identified by Z1) (see Table 2).
Table 2.

Dyadic Structure Data Set

<table>
<thead>
<tr>
<th>Dyad</th>
<th>X₁</th>
<th>Y₁</th>
<th>Z₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>4</td>
<td>3</td>
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</table>

Actor Partner Interdependence Model (APIM)

The Actor Partner Interdependence Model (APIM) is a sophisticated form of analysis that identifies how partners influence each other within the dyad, related to the constructs being assessed. APIM assumes that the predictor variable (X) predicts or causes a change in the outcome variable (Y). APIM allows for the estimation of both actor and partner effects on the same variable with SEM (Kenny, Kashy, & Cook, 2006). The actor effect consists of a direct effect of one partner’s independent variable to their own dependent variable, which can be thought of as an intrapersonal effect (i.e., X Partner 1 to Y Partner 1). The partner effect consists of a direct effect from one partner’s own independent variable to their partner’s outcome or dependent variable, which can be thought of as an interpersonal effect (i.e., X Partner 1 to Y Partner 2) (Kenny et al., 2006). In a standard APIM pattern, both partners in the dyad have actor and partner effects, resulting in four fixed effects, with error notated for each dependent variable (see Figure 8).
Figure 8. Actor Partner Interdependence Model (APIM)

APIM analysis is most easy estimated by SEM (Kenny et al., 2006). Further, the APIM parameters are applied to the SEM model at a dyad-level structure, rather than an individual structure. Specifically, the dyad level data is written as two linear equations, where each equation represents one member of the dyad. It is important to note, that when applying SEM to estimate APIM, the dyad is the new unit of analysis. The SEM analysis allows for the model to be constrained and retested investigating both actor and partner effects. For example, constraining the partner effects to be equal, resulting in a poorer model fit, suggests that there is a significant difference between the partners. Further, when estimating with SEM, best practice is to utilize the unstandardized coefficients, rather than standardized coefficients, because standardizing the coefficients per individuals will not allow them to be compared across dyads. It is necessary to determine the types of each variable, the various types include: (a) a between-dyads variable, which is a variable where both partners would have the same score, (b) a within-dyads variable, which is a variable where the partners differ on their scores, yet their average score is the same across dyads, and (c) a mixed variable, which is a variable where scores may be different within the dyad and dyad average scores are different across dyads. Computing effect size and power in APIM requires the researcher to run a Pearson correlation for the predictor (i.e., independent)
variable \( (r_x) \). If the result is greater than .5, the variable is identified as a between-dyads variable; however, if the result is less than -.5, the variable is treated as within-dyads variable. Estimating power and effect size for mixed variables is more complicated and involves the following: (a) combine between and within variables and weight that against the Pearson correlation of the mixed variable, (b) determine the adjustment factor that amends for nonindependence, (c) control for multicollinearity, (d) amend the sample size by the degree of nonindependence. Overall, APIM is the appropriate and ideal form of statistical analysis for this investigation as it allows the researcher to investigate the actor and partner effects for each couple in a relational context.

**Exploratory Research Question Two**

Proceeding the evaluation of the structural model and the analysis of the actor-partner interdependence model, the researcher examined the second exploratory research question in this investigation regarding the relationship between race and the constructs. Specifically, the researcher used Spearman’s rank-order correlation \( (\rho) \) to determine relationships between the constructs (i.e., fertility related quality of life, relationship satisfaction, resilience, depression, and shame) and the couple’s demographic variables, especially race. Following identification of potential relationships, the researcher conducted multivariate analysis of variance (MANOVA) to analyze the differences between group means in relation to the constructs (Hahs-Vaughn, 2017).
Ethical Considerations

Ethical considerations of prominence were reviewed by the institutional review board (IRB) and the researcher’s dissertation committee. Additionally, significant consideration was given to the sensitive nature of infertility. Bearing in mind that shame is a prominent factor amongst individuals with infertility (Ceballo et al., 2015), the researcher upheld the following ethical considerations:

1. Anonymity and confidentiality of participant information and data collected.
2. Participation in the study was voluntary.
3. The researcher informed participants of their rights through informed consent (upon IRB approval). Due to participation being voluntary, participants could withdrawal from the study without any consequence.
4. The researcher provided participants with their contact information to address any questions or concerns related to the study.
5. The researcher received permission to use the instruments in this study as well as to alter them to reflect sensitive language pertinent to the participant population and transfer them to an online format (i.e., Qualtrics).
6. The researcher provided resources to the participants on how to access treatment for their infertility or for counseling.

The researcher will seek permission and approval to conduct this study from the dissertation chair, committee members, and the IRB at the University of Central Florida.
Limitations

The current study had several potential limitations. Primarily, correlational studies cannot confirm causality (Kline, 2016; Tabachnick & Fidell, 2013) due to the fact that correlational studies only allow for analysis of associations amongst variables; a concern which may threaten internal validity. Specifically, correlational research is unable to determine causal relationships amongst variables due to lack of temporal antecedence (Johnson & Christensen, 2014). Second, the present relied on survey research for data collection, which relies on self-report of the participants, which is based on participants’ perception. Survey research inherently impacts results as self-report measures are not entirely reliable due to bias (Dillman et al., 2014). Hence, the researcher included a Socially Desirable Response Set Five-Item Survey (SDRS-5; Hays et al., 1989) to assess for the impact of social desirability. Furthermore, considering the topic of infertility is a sensitive topic with potentially high rates of shame (Ceballo et al., 2015), self-report bias may be greater when considering social desirability. Third, there is a potential limitation related to data instrumentation. Although instrument psychometrics are valid and reliable, all instruments still include measurement error. Hence, the researcher tested each measurement model individually to assess the model’s fit to the data (Kline, 2011). Although the aforementioned limitations are common for correlational survey research, the researcher was proactive in mitigating against all potential threats to validity.

Threats to Validity

Research validity regarding tests refers to “[…] the appropriateness, meaningfulness, and usefulness of specific inferences made from test scores” (Gall et al., 2007, p. 657). Campbell and Stanley (1963) provided a foundational understanding of threats to validity, which posits that it is imperative that the researcher always consider alternate explanations for research findings.
Specifically, correlational research is vulnerable to the following threats to validity: (a) internal validity and (b) external validity. The following section highlights potential threats to validity relevant to this study as well as an explanation of how each threat may be addressed to strength the validity of the research findings.

**Internal Validity**

Internal validity refers to the factors involved in the study design that have the potential to threaten interpretation of the findings. Moreover, internal validity examines the trustworthiness of cause and effect between the independent variable and the dependent variable, by controlling any extraneous variables that may also impact the outcome (Gall et al., 2007). Simply, internal validity refers to whether the outcome of the study can be in fact due to the manipulation of the independent variable (Campbell & Stanley, 1963). Considering that correlational research has limitations in establishing causation, the following threats to internal validity must be addressed: (a) temporal antecedence condition, (b) extraneous variables, (c) instrumentation, and (d) attrition (Gall et al., 2007; Johnson & Christensen, 2014). Beginning with the temporal antecedence condition, which is not typically identified as a specific threat to internal validity yet is necessary to address due to the nature of correlational research. Internal validity is based off the assumption that causality can be inferred amongst the variables, and causality is founded in the temporal antecedence condition, which refers to the independent variable occurring prior to the dependent variable (Gall et al., 2007). However, in correlational designs, temporal antecedence is difficult to determine as it can be unclear if variable “X” causes variable “Y” or vice versus. Hence, the inability to clearly determine cause and effect in correlational research is a threat to internal validity (Gall et al., 2007). Although the researcher is unable to safeguard against the threat of temporal antecedence, correlational results from SEM
and APIM may inform the temporal order of relationships (Kenny et al., 2006). Additionally, the presence of extraneous variables may pose a threat to internal validity (Gall et al., 2007), as extraneous variables are unaccounted for variables that may influence the outcome variables. Hence, to control for this threat, the research plans to collect and control demographic variables that may influence the outcome variable. Although the research will collect demographic variables that the literature has identified as possible impactful variables, it is possible that there may still be additional extraneous variables not controlled. Further, instrumentation is a threat to internal validity, meaning that the instruments used in the study may not measure constructs perfectly (Johnson & Christensen, 2014). Therefore, it is necessary to properly evaluate psychometrics of all instruments involved in the investigation. Although all psychometric properties may be good, self-report instruments extend this threat to internal validity as participants may imprecisely (i.e., randomly, desirably, or falsely) respond to assessment items. To safeguard against the instrumentation threat to internal validity, the researcher selected valid and reliable assessments, with good construct validity, and will account for measurement error in data analysis (Kline, 2011). Lastly, attrition refers to the participants not fully completing the study measures, resulting in missing data (Johnson & Christensen, 2014). Attrition can be caused by various factors, yet this threat to internal validity can be mitigated by: (a) overestimating the required sample size, and (b) applying appropriate missing data strategies to the dataset (Gall et al., 2007) (see Data Analysis Plan).
**External Validity**

External validity refers to the “extent to which the results of a study can be generalized to and across populations of persons, settings, times, outcomes, and treatment variations” (Campbell & Stanley, 1963; Johnson & Christensen, 2014, pg. 400). External validity is comprised of the following elements: (a) population validity, and (b) ecological validity. Population validity is the ability to generalize from the sample of participants in the investigation to the broader population of interest as well as various sub-populations within that population of interest (Johnson & Christensen, 2014). Although convenience and purposive sampling suggests shared characteristics and demographics of the target sample, unique participant demographics may still be unaccounted for in the results. Hence, consideration will be taken when making conjectures regarding generalizations. Ecological validity refers to the ability to generalize the results from the investigation to other settings (Johnson & Christensen, 2014). For example, this investigation will be occurring during a pandemic and there is no way to distinguish how the current circumstances may impact scores. Therefore, a sample recruited from various settings, locations, states, with couples that experience different forms of infertility may safeguard the results from some aspects threats to ecological validity. Lastly, future replications of the study can further support outcomes.
Chapter Three Summary

The purpose of the current study was to investigate the associations between fertility related quality of life, relationship satisfaction, resilience, depression, and shame. Chapter Three provided an outline of research methods for the current investigation, including: (a) research design, (b) population and sampling procedures, (c) data collection procedures, (d) instrumentation (i.e., FertiQol, CSI, CD-RISC, PROMIS, and FSCRS), (e) research questions and hypotheses, (f) data analyses, (g) dependent and independent variables, (h) data analysis plan for SEM and APIM, (i) ethical considerations, and (j) potential study limitations.
CHAPTER FOUR: RESULTS

Chapter four includes the results from the primary research hypothesis as well as the two exploratory research questions associated with the investigation. The purpose of this study was to explore the directional relationship of fertility related quality of life, relationship satisfaction, resilience, depression, and shame for individuals with infertility. Specifically, the investigation examined the hypothesized directional relationship that individuals with infertility with higher degrees of fertility related quality of life would have increased relationship satisfaction, increased resilience, decreased depression, and decreased shame. Exploratory analysis focused on the dyadic influence of fertility related quality of life, relationship satisfaction, resilience, depression, and shame for couples by measuring actor and partner effects. Additional analysis examined the relationship between the participants’ demographics (e.g., race), other scale variables (e.g., spirituality, treatment access, and stress), and their fertility related quality of life, relationship satisfaction, resilience, depression, and shame.

The primary research hypothesis was analyzed using structural equation modeling (SEM; Kline, 2016; Schumaker & Lomax, 2016; Tabachnick & Fidell, 2013). Actor-partner interdependence modeling (Kenny et al., 2006) was utilized to answer the first exploratory research question. Also, multivariate analyses of variance (MANOVA) provided analysis of exploratory research questions (Tabachnick & Fidell, 2013). In Chapter four, the researcher reports on the following statistical analyses: (a) data cleaning procedures and statistical assumptions for SEM, (b) preliminary dyadic analysis, (c) descriptive statistics and description of participants, (d) data analysis of the research hypothesis, and (e) data analysis of the exploratory research questions.
Data Screening and Statistical Assumptions

Data screening includes preliminary analysis and testing of statistical assumptions (Hahs-Vaughn, 2017). Prior to the primary data analysis, Hahs-Vaughn (2017) emphasized the assessment of statistical assumptions to ensure validity of the results. Data analysis began with (a) assessing sample size, (b) tests of linearity, (c) tests of univariate and multivariate outliers, (d) tests of Univariate and Multivariate Normality, and (e) tests of heteroscedasticity and multicollinearity. Finally, preliminary dyadic data assumptions were assessed.

Assumptions for SEM

Data cleaning and screening are essential steps in statistical analysis to ensure validity of results (Hahs-Vaughn, 2017). Considering SEM is a correlational research method, sample size, missing data, non-linearity, extreme outliers, non-normality, and multicollinearity can negatively impact the SEM analysis (Kline, 2016; Schumacker & Lomax, 2016). Hence, it is necessary to test each of these assumptions prior to beginning the SEM analysis. The following sections outline the results of the data screening and tests of assumptions.

Sample Size

The assumption that larger sample sizes provide the opportunity for greater generalizability is widely accepted (Kline, 2016) Due to the complexity of SEM models, larger sample sizes are required. Adequate sample size reduces the chances of obtaining a Type II error, or a “false negative” and increases the chances to achieve high power (Kline, 2016). However, there are several methods for determining the required sample size for an investigation using SEM and APIM estimated by SEM, yet researchers have adopted the recommendation for a minimum sample size of 250-500 individuals (Schumaker & Lomax, 2016). Further, Schumacker and Lomax (2016) recognized the danielsoper.com (Soper, 2018) statistical
calculator to suggest an acceptable sample size. Based on *a priori* sample size calculation, Soper’s (2018) SEM statistical calculator, suggested a minimum sample size of 400 participants to identify a small effect size (0.2) at a high power (0.8) with five latent variables and ten manifest variables at the probability of $p < .05$. Additionally, the researcher conducted an additional *a priori* sample size calculation for dyadic data analysis using Kenny’s (2019) APIM statistical calculator. Based on Kenny’s (2019) statistical calculator, there was a recommended sample size of 91 dyads to detect actor effects and partner effects to achieve a small effect size (0.2) at a high power (0.8) with the probability of $p < .05$. Therefore, with a final sample size of 556, the researcher obtained an acceptable sample size to conduct SEM (Kline, 2016). Additionally, for the dyadic analysis, the researcher obtained 52 dyads (i.e., couples). Although 52 dyads is less than the intended sample size of 91 dyads, the researcher conducted power analysis using Kenny’s (2019) APIM statistical calculator, and still attained moderate power of .77.

**Linearity**

The assumption of linearity supports correlations and regressions (Tabachnick & Fidell, 2013). Simply, a linear relationship is defined as a straight-line relationship between variables. Meeting the assumption of linearity is necessary for SEM analysis (Kline, 2016). The researcher tested the assumption of linearity through bivariate scatter plots and P-P plots. Review of the bivariate scatterplots and P-P plots indicated no violation to the linearity assumption (see Figures 9 - 19). Additionally, the researcher used an ANOVA with the best fitting relationship (i.e., linear, quadratic or cubic) to confirm the linear relationships between variables in Table 3.
Figure 9. FertiQol Mind-Body Subscale P-P Plot

Figure 10. FertiQol Emotional Subscale P-P Plot

Figure 11. FertiQol Social Subscale P-P Plot
Figure 12. FertiQol Relational Subscale P-P Plot

Figure 13. FertiQol Total P-P Plot

Figure 14. CSI P-P Plot
Figure 15. CD-RISC P-P Plot

Figure 16. PROMIS Depression P-P Plot

Figure 17. FSCRS Inadequate Subscale P-P Plot
Figure 18. FSCRS Hated Subscale P-P Plot

Figure 19. FSCRS Reassured Subscale P-P Plot

Table 3.

<table>
<thead>
<tr>
<th>Linearity Between Variables</th>
<th>Curve Fit</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FertiQol Core Total</td>
<td>CSI</td>
<td>Linear</td>
<td>10.70</td>
</tr>
<tr>
<td>CD-RISC</td>
<td>Linear</td>
<td>11.17</td>
<td>.000</td>
</tr>
<tr>
<td>PROMIS</td>
<td>Linear</td>
<td>-25.23</td>
<td>.000</td>
</tr>
<tr>
<td>FSCRS- Inadequate</td>
<td>Linear</td>
<td>-10.94</td>
<td>.000</td>
</tr>
<tr>
<td>FSCRS-Hated</td>
<td>Linear</td>
<td>-12.25</td>
<td>.000</td>
</tr>
<tr>
<td>FSCRS- Reassured</td>
<td>Linear</td>
<td>11.27</td>
<td>.000</td>
</tr>
</tbody>
</table>
Outliers

An outlier is “a case with such an extreme value on one variable (a univariate outlier) or such a strange combination of scores on two or more variables (multivariate outlier) that it distorts statistics” (Tabachnick & Fidell, 2013, p. 72). Outliers exceed an acceptable or expected range of scores that can in turn influence the results of the statistical analysis and impact generalizability (Tabachnick & Fidell, 2013). Hence, outliers must be deleted, explained, or transformed, otherwise they will impact the mean, standard deviation, or correlation coefficient.

To screen for univariate outliers, the researcher transformed responses to standardized z scores and assessed for values in $\pm 3.29$ (Tabachnick & Fidell, 2013). Results of the standardized z score assessment revealed 2 item responses (.003%) from the FertiQol Relational subscale to be outliers and 7 item responses (.012%) from the CSI to be outliers. Additionally, the researcher used Boxplots to assess for univariate outliers for each construct of interest (see Figures 20 - 30). The box represents the median, and cases that fall far away from the median and are considered outliers are characterized as little circles, while extreme outliers are characterized by an asterisk (Hahs-Vaughn, 2017; Tabachnick & Fidell, 2013). Although, boxplots may indicate the presence of univariate outliers, the scores were compared to the standardized z scores, and many, with the exception of the FertiQol Relational subscale and the CSI, fell within the acceptable range.
Figure 20. FertiQol MindBody Subscale Boxplot

Figure 21. FertiQol Emotional Subscale Boxplot
Figure 22. FertiQol Social Subscale Boxplot

Figure 23. FertiQol Relational Subscale Boxplot
Figure 24. FertiQol Core Total Boxplot

Figure 25. CSI Boxplot
Figure 26. CD-RISC Boxplot

Figure 27. PROMIS Depression Boxplot
Figure 28. FSCRS Inadequate Boxplot

Figure 29. FSCRS Hated Boxplot
In the social sciences, the presence of univariate outliers is not uncommon (Hahs-Vaughn, 2017). In fact, outliers may be indicative of extreme values within the population of interest (Osborne, 2013). Therefore, the researcher chose to keep the outliers within the data to retain the largest sample as these outliers may be legitimate scores related to participant’s physical and mental health status in the context of infertility.

**Univariate and Multivariate Normality**

SEM assumes normality of the data (Kline, 2016). Normality includes both skewness, which is indicative of distribution symmetry, and kurtosis, which is describes the shape of the distribution (Hahs-Vaughn, 2017). Further, normality is often difficult to obtain in large samples (i.e., non-significant Shapiro-Wilk’s [S-W] tests or Kolmogorov-Smirnov [K-S] tests); however, large samples ($N > 200$) are often resistant to normality violations (Hahs-Vaughn, 2017). Hence, the researcher conducted a thorough examination of normality using statistical tests and visual inspection. The researcher examined univariate normality by inspecting both Q-Q plots and
histograms (see Figures 31 - 52) (Hahs-Vaughn, 2017). Specifically, histograms with a bell-shaped curve and Q-Q plots with a reasonably straight line both indicate a normal distribution (Hahs-Vaughn, 2017).

Figure 31. Histogram FertiQol – MindBody
Figure 32. Normal Q-Q Plot of FertiQol – MindBody

Figure 33. Histogram FertiQol – Emotional
Figure 34. Normal Q-Q Plot of FertiQol – Emotional

Figure 35. Histogram FertiQol – Social
Figure 36. Normal Q-Q Plot of FertiQol – Social

Figure 37. Histogram FertiQol – Relational
Figure 38. Normal Q-Q Plot of FertiQol – Relational

Figure 39. Histogram FertiQol Core Total
Figure 40. Normal Q-Q Plot of FertiQol Core Total

Figure 41. Histogram CSI
Figure 42. Normal Q-Q Plot of CSI

Figure 43. Histogram CD-RISC
Figure 44. Normal Q-Q Plot of CD-RISC

Figure 45. Histogram PROMIS Depression
Figure 46. Normal Q-Q Plot of PROMIS Depression

Figure 47. Histogram FSCRS – Inadequate
Figure 48. Normal Q-Q Plot of FSCR − Inadequate

Figure 49. Histogram FSCR − Hated
Figure 50. Normal Q-Q Plot of FSCRS – Hated

Figure 51. Histogram FSCRS – Reassured
After visual inspection of the histograms and Q-Q plots, the researcher also tested the univariate normality of each scale; however, did not achieve the assumption of normality. Further, the researcher used additional inferential tests of normality, including both the Kolmogorov-Smirnov and Shapiro Wilk statistics. To meet the assumption of normality, the Kolmogorov-Smirnov and Shapiro Wilk statistics should not have significant scores, yet both tests demonstrated significant scores for each scale (see Table 4).
Table 4.

Tests of Univariate Normality

<table>
<thead>
<tr>
<th>Scale</th>
<th>Kolmogorov-Smirnov</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>df</td>
</tr>
<tr>
<td>FertiQol - MindBody</td>
<td>.070</td>
<td>556</td>
</tr>
<tr>
<td>FertiQol - Emotional</td>
<td>.100</td>
<td>556</td>
</tr>
<tr>
<td>FertiQol - Social</td>
<td>.066</td>
<td>556</td>
</tr>
<tr>
<td>FertiQol - Relational</td>
<td>.111</td>
<td>556</td>
</tr>
<tr>
<td>CSI</td>
<td>.119</td>
<td>556</td>
</tr>
<tr>
<td>CD-RISC</td>
<td>.063</td>
<td>556</td>
</tr>
<tr>
<td>PROMIS</td>
<td>.093</td>
<td>556</td>
</tr>
<tr>
<td>FSCRS - Inadequate</td>
<td>.080</td>
<td>556</td>
</tr>
<tr>
<td>FSCRS - Hated</td>
<td>.169</td>
<td>556</td>
</tr>
<tr>
<td>FSCRS - Reassured</td>
<td>.044</td>
<td>556</td>
</tr>
</tbody>
</table>

Considering the non-normality of the data, transformations are recommended as a way to reduce the influence of the non-normality (Hahs-Vaughn, 2017; Tabachnick & Fiddel, 2013). Tabachnick & Fiddel (2013) recommends computing a logarithmic transformation of the data to achieve normality; hence, the researcher employed a logarithmic transformation. Post logarithmic transformation, the researcher reviewed the histograms, Q-Q plots, and both the Kolmogorov-Smirnov and Shapiro Wilk statistics. However, both the significant Kolmogorov-Smirnov and Shapiro Wilk results after the logarithmic transformation confirm the non-normality of the data. Considering there was no improvement in data normality, the researcher did not use the transformed data, and preserved the original scores (Kline, 2016) (see Table 5).
Table 5.

Tests of Univariate Normality Post Logarithmic Transformation

<table>
<thead>
<tr>
<th>Scale</th>
<th>Kolmogorov-Smirnov</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>df</td>
</tr>
<tr>
<td>FertiQol- MindBody</td>
<td>.124</td>
<td>556</td>
</tr>
<tr>
<td>FertiQol - Emotional</td>
<td>.130</td>
<td>556</td>
</tr>
<tr>
<td>FertiQol - Social</td>
<td>.124</td>
<td>556</td>
</tr>
<tr>
<td>FertiQol - Relational</td>
<td>.191</td>
<td>556</td>
</tr>
<tr>
<td>CSI</td>
<td>.221</td>
<td>556</td>
</tr>
<tr>
<td>CD-RISC</td>
<td>.115</td>
<td>556</td>
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<tr>
<td>PROMIS</td>
<td>.153</td>
<td>556</td>
</tr>
<tr>
<td>FSCRS - Inadequate</td>
<td>.155</td>
<td>556</td>
</tr>
<tr>
<td>FSCRS - Hated</td>
<td>.139</td>
<td>556</td>
</tr>
<tr>
<td>FSCRS - Reassured</td>
<td>.113</td>
<td>556</td>
</tr>
</tbody>
</table>

Considering the data did not meet the assumption for normality post transformation, the researcher assumed multivariate non-normality (Hahs-Vaughn, 2017). However, the researcher tested for multivariate normality by examining the Mahalanobis distance of each variable, which was calculated through linear regression in SPSS. The Mahalanobis distance at a probability of $p < .001$ or a value greater than the $x^2(12) = 32.91$, signified a total of seven multivariate outliers. Although the data did not meet the assumption of univariate and multivariate normality, researchers have noted that in large sample sizes ($N > 200$), “a variable with statistically significant skewness often does not deviate enough from normality to make a substantive difference in the analysis” (Tabachnick & Fidell, 2013, p. 80). Therefore, the research did not remove the outliers.

**Heteroscedasticity**

Considering that the data was non-normal; failure to meet the assumption for heteroscedasticity was expected. Nevertheless, Tabachnick and Fidell (2013) indicated that “heteroscedasticity is not fatal to an analysis” and “the analysis is weakened, but invalidated”
Hence, the data were heteroscedastic, and the potential implications were considered in the analysis.

**Multicollinearity**

Multicollinearity occurs when the variables are highly correlated \( r \geq .90 \) and hence influence the correlation matrix (Hahs-Vaughn, 2017). The researcher assessed for multicollinearity by initially examining the correlation matrix, which indicated that there were no variables correlated at .90 or greater (see Table 6). In addition to correlations, multicollinearity can be assessed by tolerance values less than .10 and variance inflation factors (VIF) values above 10 for each construct. Examination of the variables indicated appropriate values for Tolerance and VIF (see Table 7), suggesting no concern with multicollinearity.

### Table 6. Correlations Between Variables

<table>
<thead>
<tr>
<th></th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
<th>CSI</th>
<th>CDRISC</th>
<th>PROMIS</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>1</td>
<td>.763**</td>
<td>.586**</td>
<td>.200**</td>
<td>.836**</td>
<td>.124**</td>
<td>.388**</td>
<td>-.610**</td>
<td>-.351**</td>
<td>-.370**</td>
<td>.334**</td>
</tr>
<tr>
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<td>.763**</td>
<td>1</td>
<td>.654**</td>
<td>.257**</td>
<td>.897**</td>
<td>.209**</td>
<td>.375**</td>
<td>-.708**</td>
<td>-.385**</td>
<td>-.369**</td>
<td>.364**</td>
</tr>
<tr>
<td>F3</td>
<td>.586**</td>
<td>.654**</td>
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<td>.237**</td>
<td>.809**</td>
<td>.175**</td>
<td>.379**</td>
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<td>-.428**</td>
<td>.403**</td>
</tr>
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<td>F4</td>
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<td>.237**</td>
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<td>.787**</td>
<td>.170**</td>
<td>-.301**</td>
<td>-.142**</td>
<td>-.250**</td>
<td>.223**</td>
</tr>
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<td>.809**</td>
<td>.541**</td>
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<td>.414**</td>
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<td>.209**</td>
<td>.175**</td>
<td>.787**</td>
<td>.414**</td>
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<td>.189**</td>
<td>-.266**</td>
<td>-.145**</td>
<td>-.260**</td>
<td>.225**</td>
</tr>
<tr>
<td>CDRISC</td>
<td>.388**</td>
<td>.375**</td>
<td>.379**</td>
<td>.170**</td>
<td>.429**</td>
<td>.189**</td>
<td>1</td>
<td>-.439**</td>
<td>-.456**</td>
<td>-.417**</td>
<td>.620**</td>
</tr>
<tr>
<td>PROMIS</td>
<td>-.610**</td>
<td>-.708**</td>
<td>-.617**</td>
<td>-.301**</td>
<td>-.732**</td>
<td>-.266**</td>
<td>-.439**</td>
<td>1</td>
<td>.530**</td>
<td>.501**</td>
<td>-.493**</td>
</tr>
<tr>
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<td>-.351**</td>
<td>-.385**</td>
<td>-.417**</td>
<td>-.142**</td>
<td>-.423**</td>
<td>-.145**</td>
<td>-.456**</td>
<td>.530**</td>
<td>1</td>
<td>.720**</td>
<td>-.687**</td>
</tr>
<tr>
<td>S2</td>
<td>-.370**</td>
<td>-.369**</td>
<td>-.428**</td>
<td>-.250**</td>
<td>-.462**</td>
<td>-.260**</td>
<td>-.417**</td>
<td>.501**</td>
<td>.720**</td>
<td>1</td>
<td>-.710**</td>
</tr>
<tr>
<td>S3</td>
<td>.334**</td>
<td>.364**</td>
<td>.403**</td>
<td>.223**</td>
<td>.432**</td>
<td>.225**</td>
<td>.620**</td>
<td>-.493**</td>
<td>-.687**</td>
<td>-.710**</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note.** **Correlation is significant at the .01 level (2-tailed). * Correlation is significant at the .05 level (2-tailed). F1 represents the FertiQol MindBody scale. F2 represents the FertiQol Emotional scale. F3 represents the FertiQol Social scale. F4 represents the FertiQol Relational scale. F5 represents the FertiQol Core total scale. S1 represents the FSCRS – Inadequate scale. S2 represents the FSCRS – Hated scale. S3 represents the FSCRS – Reassured scale.**
Table 7.

Collinearity Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>FertiQol - MindBody</td>
<td>.381</td>
<td>2.625</td>
</tr>
<tr>
<td>FertiQol - Emotional</td>
<td>.299</td>
<td>3.346</td>
</tr>
<tr>
<td>FertiQol - Social</td>
<td>.494</td>
<td>2.023</td>
</tr>
<tr>
<td>FertiQol - Relational</td>
<td>.359</td>
<td>2.784</td>
</tr>
<tr>
<td>CSI</td>
<td>.365</td>
<td>2.740</td>
</tr>
<tr>
<td>CD-RISC</td>
<td>.562</td>
<td>1.779</td>
</tr>
<tr>
<td>PROMIS</td>
<td>.379</td>
<td>2.638</td>
</tr>
<tr>
<td>FSCRS - Inadequate</td>
<td>.389</td>
<td>2.571</td>
</tr>
<tr>
<td>FSCRS - Hated</td>
<td>.365</td>
<td>2.737</td>
</tr>
<tr>
<td>FSCRS - Reassured</td>
<td>.334</td>
<td>2.993</td>
</tr>
</tbody>
</table>

Preliminary Dyadic Analysis

Dyadic analysis requires the data to meet all the aforementioned assumptions with the addition of the non-independence assumption (Kenny et al., 2006). The researcher restructured the data for dyadic analysis to include one dyad couple per row, known as a dyadic structure. Additionally, the researcher must conduct tests of distinguishability as well as correlations to determine that each partner in the dyad is significantly different or the same from their partner to satisfy the assumption of non-independence (Kenny et al., 2006). The following section outlines the tests of distinguishability and how the data met the assumption of non-independence.

Test of Distinguishability

Originally, the researcher chose to distinguish the dyads by gender. However, due to the addition of same-sex couples experiencing infertility, the researcher determined that the dyads would be indistinguishable. Indistinguishable dyads are dyads that do not have a measurable difference between them (Kenny et al., 2006). Further, indistinguishable dyads can still meet the assumption of non-independence, which requires that the both partners in the dyad are similar enough or different enough from each other. To test for non-independence with indistinguishable
dyads, the researcher conducted one way analysis of variance (ANOVA) and intraclass correlations (Kenny et al., 2006).

**ANOVA Intraclass Correlation.** To test for non-independence with indistinguishable dyads, the researcher examined ANOVA within dyads intraclass correlations. The ANOVA meets the assumption of non-independence if the F test is statistically significant, which indicates that the partners’ scores were not independent from each other. The results of the ANOVA indicated that the scores did meet the assumption of non-independence ($F = 309.919, p < .001$). Also, the intraclass correlation indicated a significant correlation with dyads ($ICC = .565, p < .001$), confirming that the assumption of non-independence was met.

**Descriptive Statistics and Data Results**

Prior to the primary data analysis, the researcher used descriptive statistics to assess the properties of the data. Descriptive data provides insight into the individuals who participated in the study. As such, the following section includes (a) response rates, (b) participant demographic information, and (c) initial instrument psychometric.

**Response Rates**

The primary means of data collection was via an online platform. Although there is not a reliable way to estimate the exact number of potential participants who received an invitation to participate in this investigation online, response rates were calculated by the following means: (a) the number of visits to the website compared to the number of clicks to the survey link, (b) the number of clicks on the survey link compared to the number of completed surveys, and (c) the number of participants that began the survey but did not complete the survey. There were a total of 2,151 visits to the website, yielding 1,054 clicks to the survey (49% response rate) and 556 completed surveys (25.8% response rate). Also, the 1,054 clicks to the survey link compared
to 556 completed surveys yielded a 52.75% response rate. Lastly, although there was no missing data in the completed packets, there were 784 started surveys compared to 556 completed surveys resulting in a 70.9% completion rate. Overall, there was a 25.8% response rate (see Table 8). Also, 88% of the survey clicks visited the website from some form of social media recruitment (e.g., Facebook and Reddit).

Table 8.

**Response Rates**

<table>
<thead>
<tr>
<th></th>
<th>Participants (N)</th>
<th>Click to Survey</th>
<th>Completed Survey</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Website Visits</td>
<td>2,151</td>
<td>1,054</td>
<td>556</td>
<td>25.8%</td>
</tr>
<tr>
<td>Survey Clicks</td>
<td>1,054</td>
<td>-</td>
<td>556</td>
<td>49%</td>
</tr>
<tr>
<td>Started Surveys</td>
<td>784</td>
<td>-</td>
<td>556</td>
<td>52.75%</td>
</tr>
</tbody>
</table>

**Participant Demographic Information**

Data collection resulted in a final sample size of 556 participants. The majority of participants identified as female (n = 508; 91.4%) compared to those who identified as male (n = 47; 8.5%). The mean age of participants was 32 years old (SD = 4.8). The majority of participants identified their ethnicity as Non-Hispanic or Latino (n = 519; 93.3%) and Caucasian (n = 473; 85.1%) compared to other participants who identified as Multiracial (n = 28; 5%), Asian (n = 28; 5%), Black/African American (n = 16; 2.9%), Other (n = 8; 1.4%), American Indian/Alaskan Native (n = 3; .5%).

Most participants had either a bachelor’s degree (n = 221; 39.7%), or master’s degree (n = 217; 39%), compared to those with a high school diploma (n = 43; 7.7%), associate degree (n = 31; 5.6%), Technical certificate (n = 28; 5%), Ph.D. (n = 15; 2.7%), or no degree or diploma (n = 1; .2%). Also, most participants had a household income greater than 75k a year (n = 414; 74.5%); while others disclosed annual household incomes of 61k-75k (n = 68; 12.2%), 31k-60k
(n = 53; 9.5%), and less than 30k (n = 21; 3.8%) as well as if they were employed full-time (n = 425; 76.4%), part-time (n = 59; 10.6%), or unemployed (n = 72; 12.9%). Further, participants reported living in a rural (n = 104; 18.7%) or urban (n = 452; 81.3%) area in Northeast (n = 120; 21.6%), South (n = 180; 32.4%), Midwest (n = 125; 22.5%), or West (n = 131; 23.6%).

Related to relationship status, most participants identified as married (n = 514; 92.4%), followed by in a committed relationship with cohabitation (n = 39; 7%) and without cohabitation (n = 3; .5%), with a relationship length of 1-3 years (n = 34; 6.1%), 4-6 years (n = 144; 25.9%), 7-10 years (n = 192; 34.5%), and greater than 10 years (n = 186; 33.5%).

Related to infertility variables, participants disclosed their type of infertility as primary (n = 501; 90.1%), secondary (n = 47; 8.5%), or both (n = 8; 1.4%) as well as the cause of their infertility as female factor (n = 197; 35.4%), male factor (n = 62; 11.2%), both female factor and male factor (n = 66; 11.9%), unexplained (n = 187; 33.6%), or unknown (n = 44; 7.9%). Additional variables regarding length of infertility, length of time since the onset of infertility, and whether the participants sought medical treatment or mental health/marriage and family therapy can be found in Table 9.
Table 9.

*Participants’ Demographic Data*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>$n$</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender Identity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>508</td>
<td>91.4%</td>
</tr>
<tr>
<td>Male</td>
<td>47</td>
<td>8.5%</td>
</tr>
<tr>
<td>Nonbinary</td>
<td>1</td>
<td>.2%</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>3</td>
<td>.5%</td>
</tr>
<tr>
<td>Asian</td>
<td>28</td>
<td>5%</td>
</tr>
<tr>
<td>Black or African American</td>
<td>16</td>
<td>2.9%</td>
</tr>
<tr>
<td>Bi-racial/Multi-racial</td>
<td>28</td>
<td>5%</td>
</tr>
<tr>
<td>Caucasian</td>
<td>473</td>
<td>85.1%</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>1.4%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>37</td>
<td>6.7%</td>
</tr>
<tr>
<td>Non-Hispanic or Latino</td>
<td>519</td>
<td>93.3%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 – 29</td>
<td>127</td>
<td>22.8%</td>
</tr>
<tr>
<td>30 – 39</td>
<td>385</td>
<td>69.3%</td>
</tr>
<tr>
<td>40 – 49</td>
<td>41</td>
<td>7.4%</td>
</tr>
<tr>
<td>50 – 59</td>
<td>2</td>
<td>.3%</td>
</tr>
<tr>
<td>60 – 65</td>
<td>1</td>
<td>.2%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
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<td></td>
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<tr>
<td>Associate Degree</td>
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<td>Bachelor’s Degree</td>
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<tr>
<td>High School Diploma/GED</td>
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<td>7.7%</td>
</tr>
<tr>
<td>Master’s Degree</td>
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<td>39%</td>
</tr>
<tr>
<td>No Degree or Diploma</td>
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<td>.2%</td>
</tr>
<tr>
<td>PhD</td>
<td>15</td>
<td>2.7%</td>
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<tr>
<td>Technical Certification</td>
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<td>5%</td>
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<tr>
<td><strong>Annual Household Income</strong></td>
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<td>&lt; $30,000</td>
<td>21</td>
<td>3.8%</td>
</tr>
<tr>
<td>$30,000 - $60,000</td>
<td>53</td>
<td>9.5%</td>
</tr>
<tr>
<td>$61,000 - $75,000</td>
<td>68</td>
<td>12.2%</td>
</tr>
<tr>
<td>&gt; $75,000</td>
<td>414</td>
<td>74.5%</td>
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<td><strong>Employment</strong></td>
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<tr>
<td>Part-Time</td>
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<tr>
<td>Full-Time</td>
<td>425</td>
<td>76.4%</td>
</tr>
<tr>
<td>Unemployed</td>
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<td>12.9%</td>
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<tr>
<td><strong>Region</strong></td>
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<td></td>
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<tr>
<td>Northeast</td>
<td>120</td>
<td>21.6%</td>
</tr>
<tr>
<td>South</td>
<td>180</td>
<td>32.4%</td>
</tr>
<tr>
<td>Characteristic</td>
<td>n</td>
<td>Total %</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td>Midwest</td>
<td>125</td>
<td>22.5%</td>
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<tr>
<td>West</td>
<td>131</td>
<td>23.6%</td>
</tr>
<tr>
<td>Rural or Urban</td>
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<td></td>
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<tr>
<td>Rural</td>
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</tr>
<tr>
<td>Urban</td>
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<td></td>
</tr>
<tr>
<td>Relationship Status</td>
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<td>81.3%</td>
</tr>
<tr>
<td>Committed Relationship with Cohabitation</td>
<td>39</td>
<td>7%</td>
</tr>
<tr>
<td>Committed Relationship without Cohabitation</td>
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<td></td>
</tr>
<tr>
<td>Married</td>
<td>3</td>
<td>0.5%</td>
</tr>
<tr>
<td>Relationship Length</td>
<td>514</td>
<td>92.4%</td>
</tr>
<tr>
<td>1 - 3 Years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 – 6 Years</td>
<td>34</td>
<td>6.1%</td>
</tr>
<tr>
<td>7 – 10 Years</td>
<td>144</td>
<td>25.9%</td>
</tr>
<tr>
<td>More Than 10 Years</td>
<td>192</td>
<td>34.5%</td>
</tr>
<tr>
<td>Infertility Length</td>
<td>186</td>
<td>33.5%</td>
</tr>
<tr>
<td>6 Months – 1 Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – 3 Years</td>
<td>77</td>
<td>13.8%</td>
</tr>
<tr>
<td>4 – 6 Years</td>
<td>311</td>
<td>55.9%</td>
</tr>
<tr>
<td>7 – 10 Years</td>
<td>107</td>
<td>19.2%</td>
</tr>
<tr>
<td>More Than 10 Years</td>
<td>39</td>
<td>7%</td>
</tr>
<tr>
<td>Time Since Initial Experience of Infertility</td>
<td>22</td>
<td>4%</td>
</tr>
<tr>
<td>Less than 1 Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 3 Years</td>
<td>123</td>
<td>22.1%</td>
</tr>
<tr>
<td>4 – 6 Years</td>
<td>263</td>
<td>47.3%</td>
</tr>
<tr>
<td>7 – 10 Years</td>
<td>109</td>
<td>19.6%</td>
</tr>
<tr>
<td>More Than 10 Years</td>
<td>35</td>
<td>6.3%</td>
</tr>
<tr>
<td>Type of Infertility</td>
<td>26</td>
<td>4.7%</td>
</tr>
<tr>
<td>Primary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>501</td>
<td>90.1%</td>
</tr>
<tr>
<td>Both</td>
<td>47</td>
<td>8.5%</td>
</tr>
<tr>
<td>Cause of Infertility</td>
<td>8</td>
<td>1.4%</td>
</tr>
<tr>
<td>Female Factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male Factor</td>
<td>197</td>
<td>35.4%</td>
</tr>
<tr>
<td>Both Male and Female Factor</td>
<td>62</td>
<td>11.2%</td>
</tr>
<tr>
<td>Unexplained</td>
<td>66</td>
<td>11.9%</td>
</tr>
<tr>
<td>Unknown (no medical help)</td>
<td>187</td>
<td>33.6%</td>
</tr>
<tr>
<td>Sought Mental Health/Marriage and Family Therapy</td>
<td>44</td>
<td>7.9%</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>342</td>
<td>61.5%</td>
</tr>
<tr>
<td>Sought Medical Treatment</td>
<td>214</td>
<td>38.5%</td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Assisted Reproductive Technology</td>
<td>82</td>
<td>14.7%</td>
</tr>
<tr>
<td>Current Medical Infertility Treatment</td>
<td>146</td>
<td>26.2%</td>
</tr>
<tr>
<td>Current Treatment</td>
<td>190</td>
<td>34.2%</td>
</tr>
<tr>
<td>Characteristic</td>
<td>n</td>
<td>Total %</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----</td>
<td>---------</td>
</tr>
<tr>
<td>Past Assisted Reproductive Technology</td>
<td>75</td>
<td>13.5%</td>
</tr>
<tr>
<td>Past Medical Infertility Treatment</td>
<td>63</td>
<td>11.4%</td>
</tr>
</tbody>
</table>

*Note. N = 556

**Initial Instrument Psychometrics**

After testing the assumptions and assessing the descriptive statistics of the sample, the researcher examined the preliminary psychometric properties of the instrument scores used to measure the constructs. The reliability of each instrument’s scores is critical in circumventing the overestimation or underestimation of a variable, which poses the risk for a Type II error. Hence, the researcher assessed the reliability estimates of the five instruments (i.e., FertiQol, CSI, CD-RISC, PROMIS, FSCRS) and their subscales. The following section describes the reliabilities and measures of central tendencies.

**FertiQol**

The instrument used to measure quality of life in individuals and couples with infertility was the *Fertility Quality of Life Tool* (Boivin et al., 2011). The FertiQol is a 26-item scale, with the inclusion of the two introductory items, in total comprising the “Core FertiQol” as Likert-type items (5-point) ranging from 0 (*very poor*) to 4 (*very good*). The FertiQol was designed to measure fertility related quality of life on four subscales: (a) *Mind Body*, (b) *Emotional*, (c) *Social*, and (d) *Relational*. The Cronbach’s α for the entire FertiQol (24-items) was .900, while the Cronbach’s α was .819 for the *Mind Body* (6 items) subscale, .876 for the *Emotional* (6 items) subscale, .735 for the *Social* (6 items) subscale, and .795 for the *Relational* (6 items) subscale. Specifically, internal consistency reliability scores for the items on the entire FertiQol and all four subscales were acceptable. Measures of central tendency and dispersion for each subscale are listed in Table 10.
Table 10.

FertiQol Measures of Central Tendency and Dispersion

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Mdn</th>
<th>Mode</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mind Body</td>
<td>11.78</td>
<td>4.68</td>
<td>11</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>Emotional</td>
<td>8.85</td>
<td>4.94</td>
<td>8</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>Social</td>
<td>11.75</td>
<td>4.64</td>
<td>12</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Relational</td>
<td>16.39</td>
<td>4.51</td>
<td>17</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>Core Total</td>
<td>48.78</td>
<td>14.45</td>
<td>48</td>
<td>39</td>
<td>86</td>
</tr>
</tbody>
</table>

CSI

The instrument used to measure relationship satisfaction in individuals and couples with infertility was the Couple Satisfaction Index (Funk & Rogge, 2007). The CSI is a unidimensional, 16-item scale with Likert scale items (6-point) ranging from 0 (always disagree) to 5 (always agree), all measuring satisfaction in the relationship. Using Cronbach’s α, reliability analysis was conducted for the CSI items and indicated very good reliability (α = .964), which was consistent with previous psychometric findings (Funk & Rogge, 2007). Measures of central tendency and dispersion for each subscale are listed in Table 11.

Table 11.

CSI Measures of Central Tendency and Dispersion

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Mdn</th>
<th>Mode</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couple Satisfaction Index</td>
<td>63.55</td>
<td>14.04</td>
<td>67</td>
<td>74</td>
<td>81</td>
</tr>
</tbody>
</table>

CD-RISC

The instrument used to measure resilience in individuals and couples with infertility was the Connor–Davidson Resilience Scale (Campbell-Sills & Stein, 2007). The CD-RISC is a unidimensional, 10-item scale developed to measure one’s ability to adapt to adverse life stressors. There are 10 Likert scale items (5-point) ranging from 0 (not true at all) to 4 (true
nearly all the time). Using Cronbach’s α, reliability analysis was conducted for the CD-RISC items and indicated a good reliability (α = .876). Measures of central tendency and dispersion for each subscale are listed in Table 12.

Table 12.

**CD-RISC Measures of Central Tendency and Dispersion**

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Mdn</th>
<th>Mode</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connor–Davidson Resilience Scale</td>
<td>25.46</td>
<td>6.10</td>
<td>26</td>
<td>26</td>
<td>33</td>
</tr>
</tbody>
</table>

**PROMIS Depression**

The instrument used to measure depression in individuals and couples with infertility was the *PROMIS Depression Instrument* (Cella et al., 2010). The PROMIS Depression Instrument is a unidimensional, 8-item scale developed to measure depression across the following five domains: (a) negative mood (e.g., sadness, guilt), (b) lack of positive affect (e.g., loss of interest), (c) information-processing issues (e.g., difficulty decision-making), (d) negative view of self (e.g., self-criticism, worthlessness), and (e) negative social experiences (e.g., loneliness, interpersonal alienation). The PROMIS Depression Instrument includes 8 Likert-type items (5-point) where participants rate how often they experience the statement, ranging from 1 (*never*) to 5 (*always*). Using Cronbach’s α, reliability analysis was conducted for the PROMIS Depression Instrument items and indicated a very good reliability (α = .909). Measures of central tendency and dispersion for each subscale are listed in Table 13.

Table 13.

**PROMIS Measures of Central Tendency and Dispersion**

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Mdn</th>
<th>Mode</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROMIS Depression 8a Form</td>
<td>26.83</td>
<td>6.28</td>
<td>27</td>
<td>26</td>
<td>32</td>
</tr>
</tbody>
</table>
FSCRS

The instrument used to measure shame in individuals and couples with infertility was the *Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* (Gilbert et al, 2004). The FSCRS is a 22-item, three factor, scale measuring self-reported feelings of internal shame, such as self-hatred and feelings of inadequacy, as well as the ability to self-reassure (Gilbert et al, 2004). The FSCRS is a Likert-type scale (5-point) ranging from 0 (*not at all like me*) to 4 (*extremely like me*). The FSCRS was designed to measure shame on three subscales: (a) *Inadequate Self*, (b) *Hated Self*, and (c) *Reassured Self*. The authors who designed the scale indicate to only use the scores from the subscales to assess shame, and not the total score (Gilbert et al, 2004). Hence, Cronbach’s α was determined only for the items on the subscales. Cronbach’s α was .897 for the *Inadequate Self* (9 items), .855 for the *Hated Self* (5 items), and .885 for the *Reassured Self* (8 items) subscales. Specifically, internal consistency reliability scores for the items on all three subscales were acceptable. Measures of central tendency and dispersion for each subscale are listed in Table 14.

Table 14.

**FSCRS Measures of Central Tendency and Dispersion**

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Mdn</th>
<th>Mode</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSCRS – Inadequate</td>
<td>19.85</td>
<td>7.94</td>
<td>21</td>
<td>24</td>
<td>36</td>
</tr>
<tr>
<td>FSCRS – Hated</td>
<td>4.67</td>
<td>4.53</td>
<td>3</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>FSCRS - Reassured</td>
<td>17.20</td>
<td>6.09</td>
<td>17</td>
<td>17</td>
<td>32</td>
</tr>
</tbody>
</table>
SDRS-5

The *Socially Desirable Response Set Five-Item Survey* (Hays et al., 1989) is a unidimensional scale measuring self-reported feelings of attitudes and feelings related to acceptance from others. The SDRS-5 is a Likert-type scale (5-point) ranging from 1 (*definitely true*) to 5 (*definitely false*). Using Cronbach’s α, reliability analysis was conducted for the SDRS-5 items and indicated very poor reliability (α = .285). Hence, the researcher removed the scale from the analysis due to the fact that the SDRS-5 was not a reliable test of social desirability in this study. Although the scale is not included in the analysis of this investigation, measures of central tendency and dispersion for each subscale are listed in Table 15.

*Table 15.*

**SDRS-5 Measure of Central Tendency and Dispersion**

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
<th>Mdn</th>
<th>Mode</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDRS-5</td>
<td>.85</td>
<td>.997</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

**Primary Data Analysis**

To assess the primary research hypothesis and exploratory research questions of this investigation, the researcher used *MPLUS* (MPLUS; Version 6.11). The researcher conducted Structural Equation Modeling (SEM; Kline, 2016; Tabachnick & Fidell, 2013) to test the relationships between the latent constructs (i.e., fertility related quality of life, relationship satisfaction, resilience, depression, and shame) with gender as a covariate. SEM is a multistage analysis used to examine how patterns of multivariate relationships among observable variables resembles patterns expected in a hypothesized model of latent constructs. The following section includes a review of the primary research hypothesis and question as well as an outline of the
following steps of SEM: (a) model specification, (b) model identification, (c) model estimation, (d) modeling testing, and (e) modeling modifications.

**Research Hypothesis**

The research hypothesis for the current study was: Couples experiencing infertility with higher levels of fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [FertiQol; Boivin et al., 2011]) will have increased relationship satisfaction (as measured by the *Couple Satisfaction Index* [CSI; Funk & Rogge, 2007]), increased resilience (as measured by the *Connor–Davidson Resilience Scale* [CDRISC; Campbell-Sills & Stein, 2007]), decreased depression (as measure by the *PROMIS Depression Instrument* [PROMIS Depression; Cella et al., 2010]), and decreased shame (as measured by *The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [FSCRS; Gilbert et al, 2004]) with gender as a covariate (see Figure 7).

**Research Question**

To what extent does fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [Boivin et al., 2011]) influence relationship satisfaction (as measured by the *Couple Satisfaction Index* [Funk & Rogge, 2007]), resilience (as measured by the *Connor–Davidson Resilience Scale* [Campbell-Sills & Stein, 2007]), depression (as measure by the *PROMIS Depression Instrument* [Cella et al., 2010]), and shame (as measured by *The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [Gilbert et al, 2004]).

**Model Specification**

The first step in SEM is model specification, which occurs prior to data analysis (see Chapter 3). In developing the theoretical model, the researcher must rely on theory to support the hypothesized relationship between variables, hence the researcher designed the theoretical structural model after conducting a thorough review of the literature (see Chapter 2).
researcher determined that a theoretical relationship would exist between fertility related quality of life, relationship satisfaction, resilience, depression, and shame (Crockett, 2012) and provided path diagrams to illustrate the anticipated measurement models and structural model. Overall, the sample data met statistical assumptions, however, limitations may exist as a result of data non-normality and heteroscedasticity that will be scrutinized in the interpretation of the results. Figure 53 presents the full theorized structural model.

---

Figure 53. Theorized Structural Model
Model Identification

In model identification, the researcher must identify a model prior to estimating model parameters (i.e., relationships among the variables) (Crockett, 2012; Kline, 2016). Model identification involves the researcher determining if the model could produce a unique solution (Schumacker & Lomax, 2016). The identified model should be theoretically possible so as to estimate a unique parameter (Crockett, 2012).

First, the researcher must identify the measurement models (i.e., FertiQol, CSI, CD-RISC, PROMIS, and FSCRS) prior to identifying the structural model. Therefore, the researcher conducted confirmatory factor analysis (CFA) for each measurement model. According to O’Brian (1994) the measurement model can be identified when it comprises (a) two or more latent variables, (b) the latent variables each have at least two observed variables that load on to it, (c) the errors of the indicators are uncorrelated, and (d) each indicator only loads on one factor. Ultimately, the researcher met O’Brian’s (1994) criteria for model identification. For instances in which the measurement model had a poor fit, the researcher evaluated the fit statistics and the model results to adjust the scale and then confirmed the new model with an additional CFA (Kline, 2016).

After the researcher identified the measurement models, the next step was to identify the full structural model, which “can be extremely cumbersome and involves highly complex mathematical calculations” (Crockett, 2012, p. 36). To increase the likelihood of structural model identification, each latent variable must have a reference (i.e., observable) variable (Kline, 2016). The reference variable has a direct path from the related latent variable fixed to one. Additionally, the structural model must follow Bollen’s (1989) recursive rule, which requires that all the relationships specified by the structural model are unidirectional and not mutually
associated (Schumacker & Lomax, 2016). The researcher considered all criteria for identification of both the measurement models and the structural model. Therefore, the researcher allowed all factors within each of the measurement models to correlate and fixed the loading of each factor to one.

**Model Estimation**

Model estimation involves the following (a) evaluating how well the model fits the data according to the fit indices, (b) analyzing the parameter estimates, and (c) considering any equivalent models. The primary purpose of model estimation is to determine if the model appropriately fits the data through the use statistical software (Kline, 2016) by adjusting parameters. The most popular parameter estimation method is maximum likelihood (ML) estimation. However, when data fails to meet the assumption of normality, such as in the current study, alternative estimation methods should be employed. Specifically, an alternative to ML that is appropriate for nonnormal data is the Santorra-Bentler or maximum likelihood robust (MLR) estimation (Kline, 2016). Thus, since data from this investigation were non-normal, the researcher used the robust MLR estimation method of parameters for all measurement models and the structural model.

**Model Testing – Measurement Models**

Model testing involves testing the fit of the estimated measurement models and structural model (Crockett, 2012). According to Crockett (2012), “the researcher must first determine whether the proposed measurement model holds, ensuring that the chosen observed indicators for a latent construct actually measure the construct” (p. 38). Therefore, the researcher conducted CFA’s for each of the measurement models to determine the best model fit before testing the structural model (Kline, 2016).
The researcher examined multiple fit indices to determine overall model fit. The following fit indices were assessed: (a) Chi-Square ($\chi^2$), (b) Relative Chi-Square ($\chi^2/df$) (c) Comparative Fit Index (CFI; Bentler, 1990), (d) TuckerLewis Index (TLI; Tucker & Lewis, 1973), (e) Root Mean Square Error of Approximation (RMSEA; Steiger, 1990), and (f) the Standardized Root Mean Square Residual (SRMR; Joreskog & Sorbom, 1988). The referential cutoff values associated with each fit index are presented in Table 16. Achieving a non-significant Chi-Square statistic ($\chi^2$) and a Relative Chi-Square ($\chi^2/df$) less than 3 are acceptable fit indices for SEM (Kline, 2016). Although Chi-Square statistics are considered the true indicator of model fit, the statistic is sensitive to larger sample sizes and will likely be significant in samples greater than 200, so other fit indices are included when determining model fit in larger samples (Byrne, 2010).

Table 16.

*Model Testing Fit Indices*

<table>
<thead>
<tr>
<th>Indices</th>
<th>Description</th>
<th>Referential Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square ($\chi^2$)</td>
<td>Assess overall fit and the discrepancy between the sample and fitted covariance matrices.</td>
<td>If $\chi^2$ is not significant, the model is acceptable.</td>
</tr>
<tr>
<td>Relative Chi-Square ($\chi^2/df$)</td>
<td>This value equals the chi-square index divided by the degrees of freedom.</td>
<td>The ratio of $\chi^2$ to df should be $\leq 2$ or $\leq 3$</td>
</tr>
<tr>
<td>Comparative Fit Index (CFI)</td>
<td>Compares the fit of a target model to the fit of an independent, or null mode.</td>
<td>$&gt; .90$ is acceptable; $\geq .95$ is a good fit.</td>
</tr>
<tr>
<td>Tucker Lewis Index (TLI)</td>
<td>Represents an incremental fit measure.</td>
<td>$&gt; .90$ is acceptable; $\geq .95$ is a good fit.</td>
</tr>
<tr>
<td>Root Mean Squared Error of Approximation (RMSEA)</td>
<td>The difference between the observed covariance matrix per degree of freedom and the hypothesized covariance matrix.</td>
<td>$0.06 - 0.08$ is acceptable; $\leq 0.06$ is a good fit.</td>
</tr>
</tbody>
</table>
Standardized Root Mean Square Residual (SRMR)
The average of standardized residuals between the observed and the hypothesized covariance matrices.

0.05 - 0.08 is acceptable; ≤ 0.06 is a good fit.


Confirmatory Factor Analysis – FertiQol

To measure fertility related quality of life in individuals and couples with infertility, the researcher used Fertility Quality of Life Tool (Boivin et al., 2011). The researcher conducted a CFA on the theorized FertiQol measurement model containing four correlated factors (i.e., Mind Body, Emotional, Social, and Relational) with 24 indicators total. Results (Figure 54) indicated factor loadings ranging from low (0.371; FQL24) to high (0.854; FQL16) with an overall acceptable fit: χ²/df = 2.71; CFI = 0.919; TLI = 0.909; RMSEA = 0.056; SRMR = 0.061. Table 17 presents the fit indices for the FertiQol measurement model.

Table 17.
Model Fit Indices of the FertiQol

<table>
<thead>
<tr>
<th></th>
<th>χ²</th>
<th>df</th>
<th>χ²/df</th>
<th>p</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theorized Measurement Model</td>
<td>669.025</td>
<td>276</td>
<td>2.71</td>
<td>.000</td>
<td>.919</td>
<td>.909</td>
<td>.056</td>
<td>.061</td>
</tr>
</tbody>
</table>
Confirmatory Factor Analysis – CSI

To measure relationship satisfaction in individuals and couples with infertility, the researcher used the *Couple Satisfaction Index* (Funk & Rogge, 2007). The researcher conducted a CFA on the theorized CSI unidimensional measurement model. Results (Figure 55) indicated factor loadings ranging from moderate (.575; CSQ15) to high (.919; CSQ10) with an overall unacceptable fit: $\chi^2/df = 5.01$; CFI = .929; TLI = .918; RMSEA = .085; SRMR = .036. To improve goodness of fit, the researcher reviewed all factor loadings. Although, there were no factor loadings below the suggested cutoff (0.4), the researcher removed the item with the lowest
factor loading (.575). Subsequently, the researcher ran a CFA to test the modified CSI model (see Figure 56) and results yielded an acceptable fit: \( \chi^2/df = 4.52; \text{CFI} = .940; \text{TLI} = .931; \text{RMSEA} = .080; \text{SRMR} = .035. \) Although, the relative Chi-Square (\( \chi^2/df \)) was above 3, the RMSEA was exactly .08, while all the other fit indices indicated a good model fit. Hence, the researcher determined Modified Measurement Model 1 to be the best fitting model of the CSI for use in the structural model. Table 18 presents the fit indices for the CSI measurement models.

Table 18

<table>
<thead>
<tr>
<th>Model Fit Indices of the CSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \chi^2 )</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Theorized Measurement Model</td>
</tr>
<tr>
<td>Modified Measurement Model</td>
</tr>
</tbody>
</table>

Figure 55. Confirmatory Factor Analysis: CSI Theorized Measurement Model
Confirmatory Factor Analysis: CSI Modified Measurement Model 1

Confirmatory Factor Analysis - CD-RISC

To measure resilience in individuals and couples with infertility, the researcher used the Connor–Davidson Resilience Scale (Campbell-Sills & Stein, 2007). The researcher conducted a CFA on the theorized CD-RISC unidimensional measurement model. Figure 57 indicated factor loadings ranging from moderate .543 (RQ3) to .774 (RQ2) with an overall acceptable fit: \( \chi^2/df = 4.98; \ CFI = .921; \ TLI = .898; \ RMSEA = .085; \ SRMR = .042. \) Although, the relative Chi-Square (\( \chi^2/df \)) was above 3, researchers have indicated that if all other fit indices are in the acceptable range, and the relative Chi-Square is less than 5, the model can be considered acceptable (Schumacker & Lomax, 2010). Hence, considering all other fit indices were still in the acceptable range, the researcher determined that the Theorized Measurement Model was the
best fitting model of the CDRISC for use in the structural model. Table 19 presents the fit indices for the CDRISC measurement model.

Table 19.

Model Fit Indices of the CDRISC

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>p</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theorized Measurement Model</td>
<td>174.380</td>
<td>35</td>
<td>4.98</td>
<td>.000</td>
<td>.921</td>
<td>.898</td>
<td>.086</td>
<td>.042</td>
</tr>
</tbody>
</table>

Figure 57. Confirmatory Factor Analysis: CDRISC Theorized Measurement Model
Confirmatory Factor Analysis - PROMIS Depression

To measure depression in individuals and couples with infertility, the researcher used the PROMIS Depression Instrument (Cella et al., 2010). The researcher conducted a CFA on the theorized PROMIS Depression unidimensional measurement model. Results (Figure 58) indicated factor loadings ranging from .636 (DQ5) to .813 (DQ8) with an overall unacceptable fit: $\chi^2/df = 14.89; \text{CFI} = .883; \text{TLI} = .836; \text{RMSEA} = .158; \text{SRMR} = .055$. To improve goodness of fit, the researcher reviewed all factor loadings. Although, there were no factor loadings below the suggested cutoff (0.4), the researcher removed the item with the lowest factor loading (.636). Subsequently, the researcher ran a CFA to test the modified PROMIS Depression model (see Figure 59) and results still yielded an unacceptable fit: $\chi^2/df = 13.16; \text{CFI} = .907; \text{TLI} = .861; \text{RMSEA} = .148; \text{SRMR} = .050$. Consequently, the researcher returned to the original theorized model and assessed the model results estimates. Estimates indicated that there were four items estimated closely in association (DQ2 [.905]; DQ3 [.943]; DQ4 [.981]; DQ5 [.974]), hence the researcher modified the model to only include the four items. Subsequently, the researcher ran a CFA to test the modified PROMIS Depression model (see Figure 60) and results yielded an acceptable fit: $\chi^2/df = 4.45; \text{CFI} = .992; \text{TLI} = .975; \text{RMSEA} = .080; \text{SRMR} = .015$. Although, the relative Chi-Square ($\chi^2/df$) was above 3, the RMSEA was exactly .08, while all the other fit indices indicated a good model fit. Hence, the researcher determined Modified Measurement Model 2 to be the best fitting model of the PROMIS Depression for use in the structural model. Table 20 presents the fit indices for the PROMIS Depression measurement models.
Table 20.

*Model Fit Indices of the PROMIS Depression*

<table>
<thead>
<tr>
<th>Model Type</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>p</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>SRMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theorized Measurement Model</td>
<td>297.822</td>
<td>20</td>
<td>14.89</td>
<td>.000</td>
<td>.883</td>
<td>.836</td>
<td>.158</td>
<td>.055</td>
</tr>
<tr>
<td>Modified Measurement Model 1</td>
<td>184.337</td>
<td>14</td>
<td>13.16</td>
<td>.000</td>
<td>.907</td>
<td>.861</td>
<td>.148</td>
<td>.050</td>
</tr>
<tr>
<td>Modified Measurement Model 2</td>
<td>9.085</td>
<td>2</td>
<td>4.45</td>
<td>.010</td>
<td>.992</td>
<td>.975</td>
<td>.080</td>
<td>.015</td>
</tr>
</tbody>
</table>

*Figure 58. Confirmatory Factor Analysis: PROMIS Theorized Measurement Model*
Figure 59. Confirmatory Factor Analysis: PROMIS Modified Measurement Model 1

Figure 60. Confirmatory Factor Analysis: PROMIS Modified Measurement Model 2
**Confirmatory Factor Analysis - FSCRS**

To measure shame in individuals and couples with infertility, the researcher used the *Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* (Gilbert et al, 2004). The researcher conducted a CFA on the theorized FSCRS measurement model containing three correlated factors (i.e., Inadequate Self, Hated Self, Reassured Self) with 22 indicators total. Results (Figure 61) indicated factor loadings ranging from low (.494; SQ19) to high (.840; SQ13) with an overall acceptable fit: $\chi^2$/df = 3.16; CFI = .925; TLI = .915; RMSEA = .062; SRMR = .043. Table 21 presents the fit indices for the FSCRS measurement model.

Table 21.

<table>
<thead>
<tr>
<th>Model Fit Indices of the FSCRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theorized Measurement Model</td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Theorized Measurement Model</td>
</tr>
</tbody>
</table>
Model Modification – Measurement Models

During the phase of model modification, the researcher modifies the measurement model to achieve optimal fit. It is common that measurement models require modification to achieve optimal fit before the researcher can test the structural model (Kline, 2016). In this study, the researcher assessed each measurement model fit and made modifications after careful examination of the modification indices, model results, factor loadings, and residuals. Specifically, the researcher modified models through item deletion as an item may not fit the model evident by a low correlation to its latent variable (i.e., factor loading), meaning that the
researcher may need to remove the item to increase model fit (Kline, 2016). In sum, the researcher deleted five items (CSQ15, DQ1, DQ6, DQ7, DQ8) across 80 items (<1%) in the measurement models. Subsequently, the researcher reexamined the final measurement models of CSI (see Figure 62) and PROMIS Depression (see Figure 63) after the modifications to assess for measures of central tendency and reliability (Table 22).

Table 22.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cronbach’s α</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Mdn</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSI</td>
<td>.965</td>
<td>63.55</td>
<td>14.04</td>
<td>81</td>
<td>67</td>
<td>74</td>
</tr>
<tr>
<td>PROMIS</td>
<td>.831</td>
<td>26.83</td>
<td>6.288</td>
<td>32</td>
<td>27</td>
<td>26</td>
</tr>
</tbody>
</table>

Figure 62. Final Modified Model – CSI

Figure 63. Final Modified Model – PROMIS Depression
Model Testing – Structural Model

Once the measurement models were identified and tested for both the latent independent (i.e., FertiQol) and dependent (i.e., CSI, CD-RISC, PROMIS, FSCR) variables, the researcher tested the theorized structural model (see Figure 64) to establish to what degree the model is supported by the sample data (Crockett, 2012). The researcher considered the overall fit of the model (i.e., fit indices) and the individual fit parameters (i.e., parameter estimates and standardized results; Kline, 2016). The researcher evaluated each parameter for statistical significance from zero, directionality (i.e., ±), and deduced meaning (Crockett, 2012; Kline, 2016). Parameter estimates (i.e., correlation coefficients) should range from -1.00 to +1.00. Specifically, estimates with values of 0.5-1.00 infer a strong relationship, while values from 0.30 to .49 represent a moderate relationship and values less than .29 represent a weak relationship (Pallant, 2016). Then, the researcher examined the standardized values for both the continuous variables and the categorical covariate variable (i.e., Gender).

Hypothesized Structural Model

The researcher specified the hypothesized structural model (see Figure 64) based on the modified measurement models (see Figures 54 - 61). Fertility related quality of life was identified as an exogenous (i.e., independent or predictor) latent variable comprised of four subscales of the FertiQol: (a) Mind Body, (b) Emotional, (c) Social, and (d) Relational. Couple satisfaction, resilience, and depression were considered unidimensional endogenous variables (i.e., dependent or outcome). Shame was also identified as an endogenous variable comprised of three subscales of the FSCR: (a) Inadequate Self, (b) Hated Self, and (c) Reassured Self.

The hypothesized structural model indicated the theorized directional relationship (Figure 64) suggesting that individuals and couples with a greater degree of fertility related quality of life
would have (a) increased relationship satisfaction, (b) increased resilience, (c) decreased depression, and (e) decreased shame. Hence, the researcher predicted a statistically significant *positive* directional relationship between fertility related quality of life to relationship satisfaction and resilience, and a significant *negative* directional relationship between fertility related quality of life to depression and shame.

The theorized structural model consisting of fertility related quality of life (observed by *mind body*, *emotional*, *social*, and *relational* FertiQol subscales) predicting relationship satisfaction (observed by the CSI’s *sixteen* indicators), resilience (observed by the CD-RISC’s *ten* indicators), depression (observed by the PROMIS’s modified *four* indicators), and shame (observed by *inadequate self*, *hated self*, and *reassured self* FSCRS subscales) succeeded in converging, however the model demonstrated a poor fit (Figure 64): $\chi^2/df = 5.36$, $p = .000$; CFI = .810; TLI = .796; RMSEA = .089; SRMR = .098. Results indicated a significant positive relationship (5.52% of variance accounted for) between fertility related quality of life and relationship satisfaction ($b = .058; \beta = .235; p = .000$) with a small effect size. Also, there was a significant positive relationship (21.62% of variance accounted for) between fertility related quality of life and resilience ($b = .062; \beta = .465; p = .000$) with a medium effect size.

Additionally, there was a strong significant negative relationship (66.26% of variance accounted for) between fertility related quality of life and depression ($b = -.151; \beta = -.814; p = .000$) with a large effect size. Also, there was a significant negative relationship (26.01% of variance accounted for) between fertility related quality of life and shame ($b = -.849; \beta = -.510; p = .000$) with a medium effect size. Lastly, the construct fertility related quality of life was significantly and positively influence by the four subscales: (a) mind-body (66.91% variance accounted for),
(b) emotional (84.27% variance accounted for), (c) social (51.59% variance accounted for), and (d) relational (8.46% variance accounted for).
Figure 64. Theorized Structural Model
Given the poor model fit, the researcher investigated the standardized model results and the model modification indices. The results indicated that all dependent variables were significantly predicted by fertility related quality of life (Table 23). However, modification indices indicated that there was an astronomical relationship (388.203) between the tenth question on the resilience scale (i.e., CDR10) and the sixteenth question on the relationship satisfaction scale (i.e., RS16) meaning that these two items correlate at a strong degree aside from the latent factors when the assumption is that they are correlated at zero. Hence, the researcher investigated the items on both scales and determined that there was likely a method effect due to wording appearing similar to the participant (Kline, 2016). For example, CDR10 referenced “unpleasant or painful feelings like sadness, fear, and anger,” and RS16 referenced feeling “miserable.”

Table 23.

Theorized Structural Model Standardized Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimate</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship Satisfaction ON FQL</td>
<td>.235</td>
<td>.000</td>
</tr>
<tr>
<td>Resilience ON FQL</td>
<td>.465</td>
<td>.000</td>
</tr>
<tr>
<td>Depression ON FQL</td>
<td>-.814</td>
<td>.000</td>
</tr>
<tr>
<td>Shame ON FQL</td>
<td>-.510</td>
<td>.000</td>
</tr>
</tbody>
</table>

*Note. ON represents the directional relationship where FQL (fertility related quality of life) predicts relationship satisfaction, resilience, depression, and shame. The exogenous (i.e., independent or predictor) variable always appears on the right side of the ON.

Model Modification – Structural Model

According to Schumacker and Lomax (2016), “when hypothesis testing, a model may not fit the data” (p. 108). Hence, the researcher must employ model modifications in an attempt to specify a model that optimally fits the data. The most common methods for supporting modifications are to examine the standardized estimates, examine the modification model results,
and use theory of the intended construct relationships (Crockett, 2012; Kline, 2016). Given the lack of fit for the theorized structural model, the researcher attempted to modify the structural model. The following section presents the results of the three modified structural models.

**Modified Structural Model 1**

Considering the results of the hypothesized structural model indicated a strong relationship between the item on the resilience scale (i.e., CDR10) and the item on the relationship satisfaction scale (i.e., RS16), the researcher added a correlation between the items to test the modified structural model. Results of the modified structural model resulted in a slightly better, yet still not acceptable model fit: (Figure 65): $\chi^2/df = 3.71, p = .000; \text{CFI} = .882; \text{TLI} = .873; \text{RMSEA} = .070; \text{SRMR} = .095$. The Chi-Square ($\chi^2; p < .05$), the CFI and the SRMR did not show an acceptable fit. As previously stated, the Chi-Square is sensitive to larger samples sizes (< 200), hence samples larger than 200 are expected to have a significant Chi-Square (Kline, 2016). The CFI did not meet the minimum requirement for good fit (> .90) and SRMR did not meet the minimum requirement for good fit (< .08; Kline, 2016). Additionally, the path from fertility related quality of life to the following constructs were significant: (a) relationship satisfaction was significant and positive ($b = .058; \beta = .235; p = .000; 5.52\%$ variance accounted for) with a small effect size, (b) resilience was significant and positive ($b = .062; \beta = .468; p = .000; 21.9\%$ variance accounted for) with a medium effect size, (c) depression was significant and negative ($b = -.151; \beta = -.813; p = .000; 66.09\%$ variance accounted for) with a large effect size, and (d) shame was significant and negative ($b = -.846; \beta = -.510; p = .000; 26.01\%$ variance accounted for) with a medium effect size.
Interestingly, although the path from fertility related quality of life to relationship satisfaction was significant, the estimate was quite low and below the cutoff (.4). Hence, the researcher examined associations between relationship satisfaction and other variables.
Figure 65. Modified Structural Model 1
**Modified Structural Model 2**

Based on the results from the first modified structural model, the researcher examined the associations between relationship satisfaction and other variables. The results indicated a strong relationship between the *Relational* subscale of the FertiQol and the construct relationship satisfaction (315.240). First, the researcher consulted theory and determined that the relational aspect of fertility related quality of life has the viability to stand alone as an independent construct with the sampled population as emphasis was placed on the individual’s perception of their romantic relationship (Gerrity, 2001). Theoretically, the relational aspect of infertility is highly related to relationship satisfaction. Hence, after examining theory, the researcher determined that the *Relational* subscale could be parsed out from the construct fertility related quality of life and stand alone as a second predictor variable for this population. The overall goodness of fit for the second modified structural model yielded an acceptable fit (Figure 66):

\[
\chi^2/df = 3.06, p = .000; \text{CFI} = .911; \text{TLI} = .904; \text{RMSEA} = .061; \text{SRMR} = .073.
\]

Although the majority of the fit indices indicated an acceptable fit, the relative Chi-Square \((\chi^2/df)\) is not acceptable (> 3). Additionally, the path from the fertility related quality of life construct to the following constructs were significant: (a) resilience was significant and positive \( b = .060; \beta = .454; p = .000; 20.61\% \) variance accounted for) with a medium effect size, (b) depression was significant and negative \( b = -.145; \beta = -.800; p = .000; 64 \% \) variance accounted for) with a large effect size, and (c) shame was significant and negative \( b = -.801; \beta = -.490; p = .000; 24.01\% \) variance accounted for) with a medium effect size. The path from the fertility related quality of life construct to relationship satisfaction was not significant \( b = .000; \beta = -.001; p = .973\), supporting that when the *Relational* subscale of fertility related quality of life is removed, the construct no longer predicts relationship satisfaction. Alternatively, the *Relational* subscale
significantly and positively predicted relationship satisfaction \((b = .158; \beta = .771; p = .000; 59.75\%\text{ variance accounted for})\) with a large effect size. Also, the Relational subscale significantly and positively predicted depression \((b = -.013; \beta = -.088; p = .012; < 1\%\text{ variance accounted for})\) with a very small effect size. Lastly, the Relational subscale did not predict resilience \((b = .006; \beta = .057; p = .226)\) or shame \((b = -.108; \beta = -.080; p = .220)\).
Figure 66. Modified Structural Model 2
Modified Structural Model 3

The researcher examined the model modification indices and results indicated that there were two relationship satisfaction items highly related (i.e., RS12 and RS15; 74.864) and two resilience items highly related (i.e., CDR1 and CDR2; 68.127). Hence, the researcher added correlations between the related items to form modified structural model 3. The overall goodness of fit for the third modified structural model yielded a good fit (Figure 67): $\chi^2/df = 2.83$, $p = .000$; CFI = .921; TLI = .914; RMSEA = .058; SRMR = .072. All fit indices met referential values, indicating a good overall fit. Additionally, the path from the fertility related quality of life construct to the following constructs were significant: (a) resilience was significant and positive ($b = .055; \beta = .453; p = .000; 20.52\%$ variance accounted for) with a medium effect size, (b) depression was significant and negative ($b = -.145; \beta = -.800; p = .000; 64\%$ variance accounted for) with a large effect size, and (c) shame was significant and negative ($b = -.798; \beta = -.490; p = .000; 24.01\%$ variance accounted for) with a medium effect size. The path from fertility related quality of life to relationship satisfaction was not significant ($b = .000; \beta = -.002; p = .961$).

Moreover, the Relational subscale significantly and positively predicted relationship satisfaction ($b = .158; \beta = .773; p = .000; 59.75\%$ variance accounted for) with a large effect size, and depression ($b = -.013; \beta = -.088; p = .000; <1\%$ variance accounted for) with a very small effect size. Overall, the variance explained in the dependent variables in this model were good: (a) relationship satisfaction ($R^2 = .597; 59.7\%$ variance accounted for), (b) resilience ($R^2 = .209; 20.9\%$ variance accounted for), (c) depression ($R^2 = .648; 64.8\%$ variance accounted for), (d) shame ($R^2 = .246; 24.6\%$ variance accounted for). Considering the overall good fit of the model and the statistically significant paths from the independent variables to the dependent variables, modified structural model 3 was determined to be the best fitting model.
Figure 67. Modified Structural Model 3
Structural Model with Covariate

Once the best fitting structural model was identified, the researcher tested the theorized structural model with the covariate Gender (see Figure 68) to establish to what degree the model is supported when controlling for gender (Kline, 2016) as well as how gender influences the constructs. The researcher considered the overall fit of the model (i.e., fit indices) and the individual fit parameters (i.e., parameter estimates and standardized results; Kline, 2016). Then, the researcher examined the standardized values for both the continuous variables and the categorical covariate variable (i.e., Gender). The overall goodness of fit for the structural model with gender as a covariate was good (Figure 68): $\chi^2/df = 2.86$, $p = .000$; CFI = .916; TLI = .909; RMSEA = .058; SRMR = .075. All fit indices met referential values, indicating a good overall fit. Additionally, the path from the fertility related quality of life construct to the following constructs, while controlling for gender, were significant: (a) resilience was significant and positive ($b = .052; \beta = .427; p = .000$; 18.23% variance accounted for) with a medium effect size, (b) depression was significant and negative ($b = -.143; \beta = -.794; p = .000$; 63.04% variance accounted for) with a large effect size, and (c) shame was significant and negative ($b = -.145; \beta = -.472; p = .000$; 22.27% variance accounted for) with a medium effect size. Also, the Relational subscale significantly and positively predicted relationship satisfaction ($b = .158; \beta = .166; p = .000$; 59.75% variance accounted for) with a small effect size. Further, including gender as a covariate reduced the effect size of the Relational subscale on relationship satisfaction from large to small indicating that controlling for gender impacted the results of relationship satisfaction. No other paths from Relational subscale were significant. Regarding the covariate, gender significantly ($p < .05$) influenced resilience ($b = .144; \beta = .309; p = .031$) with a small effect size, indicating that men tended to have greater resilience than women. Overall, the variance
explained in the dependent variables in this model were good: (a) relationship satisfaction ($R^2 = .599$; 59.9% variance accounted for), (b) resilience ($R^2 = .195$; 19.5% variance accounted for), (c) depression ($R^2 = .641$; 64.1% variance accounted for), (d) shame ($R^2 = .234$; 23.4% variance accounted for). Considering the overall good fit of the model and the statistically significant paths from the independent variables to the dependent variables, the covariate of gender was a reasonable covariate to include in the model. In sum, the model with gender as a covariate and the relational aspect of fertility related quality of life as an additional independent variable increased model fit and provided clearer results, as the relational aspect of fertility related quality of life primarily predicted relationship satisfaction. Also, the model confirmed the research hypothesis that fertility related quality of life influenced relationship satisfaction, resilience, depression, and shame in individuals with infertility.
Figure 68. Structural Model with Gender as Covariate
Secondary Data Analyses

The researcher conducted additional statistical procedures to examine the exploratory research questions of this investigation. The researcher conducted the following statistical analysis: (a) the Actor Partner Interdependence Model (APIM; Kenny et al., 2006) to assess the dyadic relationship of the variables, (b) Spearman’s rank-order correlation, and (c) multivariate analysis of variance (MANOVA; Hahs-Vaughn, 2017). Considering the non-normality of the data, the researcher utilized Spearman’s rank-order correlation (ρ), which is the nonparametric version of the Pearson product-moment correlation, to assess relationships between the constructs of interest (i.e., fertility related quality of life, relationship satisfaction, resilience, depression, and shame) and the demographic variable of race.

Exploratory Research Question One

What are the actor and partner effects amongst couples’ fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]), relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), depression (as measured by the PROMIS Depression Instrument [Cella et al., 2010]), and shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004])?

The Actor Partner Interdependence Model (APIM) is a sophisticated form of analysis that identifies how partners influence each other within the dyad, related to the constructs being assessed (Kenny et al., 2006). Further, APIM allows for the estimation of both actor and partner effects on the same variable with SEM (see Chapter 3). The researcher estimated the APIM models with SEM through a statistical app developed by Stas, Kenny, Mayer, and Loeys (2018).
The following section outlines the results of the APIM analysis, divided by actor and partner effects.

**Direct Effects**

Dyads were considered indistinguishable for the current investigation due to the presence of same sex couples. Non-distinguishable dyads means that the couple does not have a measurable distinguishable factor between them, such as gender. Hence, since dyads are considered non-distinguishable, direct actor effects refers to how much one partner’s change in their own independent variable (i.e., fertility related quality of life) effects their own outcome variable (i.e., relationship satisfaction, resilience, depression, and shame). Alternatively, the direct partner effect refers to how much one partner’s (i.e., partner a) change in their own independent variable (i.e., fertility related quality of life) effects the other partner’s (i.e., partner b) outcome variable (i.e., relationship satisfaction, resilience, depression, and shame). Although, the sample of couples in the current study is small ($n = 52$) and results do not provide adequate power (.77) to draw major conclusions, the results of this exploratory analysis still provides insight into potential actor and partner effects that warrant further exploration.

**Actor Effects.** The actor effects are presented in Table 24. As hypothesized, the actor effect of fertility related quality of life was statistically significant ($p < .05$) on relationship satisfaction ($b = .244; \beta = .228$) with a small effect size, on resilience ($b = .213; \beta = .379$) with a small effect size, on depression ($b = -.383; \beta = -.704$) with a large effect size, on shame-inadequate ($b = -.259; \beta = -.345$) with a small effect size, on shame-hated ($b = -.137; \beta = -.338$) with a small effect size, and on shame-reassured ($b = .226; \beta = .376$) with a small effect size. Hence, the greater the individual’s fertility related quality of life the more likely they are to
experience greater relationship satisfaction, greater resilience, and greater self-reassurance as well as less depression, less inadequacy, and less self-hatred.

The Mind Body aspect of fertility related quality of life had a statistically significant ($p < .05$) actor effect on resilience ($b = .596; \beta = .423$), with a small effect size, on depression ($b = -.908; \beta = -.666$) with a medium effect size, on shame-inadequate ($b = -.614; \beta = -.326$) with a small effect size, on shame-hated ($b = -.346; \beta = -.341$) with a small effect size, and on shame-reassured ($b = .527; \beta = .349$) with a small effect size. Hence, the greater the individual’s mind-body related quality of life, the more likely they are to experience greater resilience, and greater self-reassurance as well as less depression, less inadequacy, and less self-hatred.

The Emotional aspect of fertility related quality of life had a statistically significant ($p < .05$) actor effect on resilience ($b = .589; \beta = .386$) with a small effect size, on depression ($b = -1.027; \beta = -.697$) with a medium effect size, on shame-inadequate ($b = -.678; \beta = -.333$) with a medium effect size, on shame-hated ($b = -.332; \beta = -.491$) with a medium effect size, and on shame-reassured ($b = .568; \beta = .389$) with a small effect size. Hence, the greater the individual’s emotional related quality of life, the more likely they are to experience greater resilience, and greater self-reassurance as well as less depression, less inadequacy, and less self-hatred.

The Social aspect of fertility related quality of life had a statistically significant ($p < .05$) actor effect on resilience ($b = .521; \beta = .348$) with a small effect size, on depression ($b = -1.019; \beta = -.703$) with a medium effect size, on shame-inadequate ($b = -.909; \beta = -.454$) with a medium effect size, on shame-hated ($b = -.471; \beta = -.437$) with a small effect size, and on shame-reassured ($b = .718; \beta = .448$) with a small effect size. Hence, the greater the individual’s social
related quality of life, the more likely they are to experience greater resilience, and greater self-reassurance as well as less depression, less inadequacy, and less self-hatred.

The Relational aspect of fertility related quality of life had a statistically significant ($p < .05$) actor effect on relationship satisfaction ($b = 2.161; \beta = .844$) with a large effect size, and on depression ($b = -.486; \beta = -.375$) with a small effect size. Hence, the greater the individual’s relational related quality of life, the more likely they are to experience greater relationship satisfaction and less depression. In sum, these results support the hypothesis that greater levels of fertility related quality of life (i.e., mind-body, emotional, social, relational) have effects on an individual’s level of relationship satisfaction, resilience, depression, and shame. Specifically, a key result is that individuals who experience greater social and related support tend to have less depression and shame related to their infertility.

**Partner Effects.** The partner effects are presented in Table 24. As hypothesized, the Relational aspect of fertility related quality of life had a statistically significant ($p < .05$) partner effect on relationship satisfaction ($b = .418; \beta = .164$), with a small effect size. Hence, one partner’s level of relational quality of life affected the other partner’s level of relationship satisfaction. Also, the Relational aspect of fertility related quality of life had a statistically significant ($p < .05$) partner effect on shame-hated ($b = -.183; \beta = -.190$) with a small effect size. Hence, one partner’s level of relational quality of life affected the other partner’s level of shame related to self-hatred, meaning that if the first partner had greater levels of relational quality of life, then the other partner would experience less self-hatred.

No other partner effects were indicated. Actor and partner effects allow the researcher to investigate how one partner influences the other and can be valuable in assessing couple relationships. Although two partner effects were detected with small effect sizes, the results
indicate that partner effects do exist with the *Relational* aspect of fertility related quality of life, relationship satisfaction, and shame- *hated*. A larger sample size would increase the probability of identifying significant partner effects.

Table 24.

**APIM Effect Estimates for Indistinguishable Dyads**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Estimate</th>
<th>Sig.</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>FQL Total → CSI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actor Effect</td>
<td>.244</td>
<td>&lt; .05*</td>
<td>.228</td>
</tr>
<tr>
<td>Partner Effect</td>
<td>.082</td>
<td>.252</td>
<td>.076</td>
</tr>
<tr>
<td>FQL Mind Body → CSI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actor Effect</td>
<td>.079</td>
<td>.720</td>
<td>.029</td>
</tr>
<tr>
<td>Partner Effect</td>
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<td>.713</td>
<td>-.030</td>
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<tr>
<td>Actor Effect</td>
<td>.279</td>
<td>.193</td>
<td>.096</td>
</tr>
<tr>
<td>Partner Effect</td>
<td>.132</td>
<td>.538</td>
<td>.045</td>
</tr>
<tr>
<td>FQL Social → CSI</td>
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<tr>
<td>Actor Effect</td>
<td>.320</td>
<td>.182</td>
<td>.112</td>
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<tr>
<td>Partner Effect</td>
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<td>.547</td>
<td>-.050</td>
</tr>
<tr>
<td>FQL Relational → CSI</td>
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<td></td>
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<tr>
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<td>&lt; .05*</td>
<td>.844</td>
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<td>Partner Effect</td>
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<tr>
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<td>&lt; .05*</td>
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<tr>
<td>Partner Effect</td>
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<td>.732</td>
<td>.020</td>
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<tr>
<td>FQL Mind Body → CDRISC</td>
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</tr>
<tr>
<td>Actor Effect</td>
<td>.596</td>
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<td>.856</td>
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<tr>
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<tr>
<td>Partner Effect</td>
<td>.083</td>
<td>.337</td>
<td>.054</td>
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</tr>
<tr>
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<td>&lt; .05*</td>
<td>.348</td>
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<tr>
<td>Partner Effect</td>
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<td>.558</td>
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<tr>
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<td>-.704</td>
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<td>.981</td>
<td>.001</td>
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<tr>
<td>Effect</td>
<td>Estimate</td>
<td>Sig.</td>
<td>Effect Size</td>
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<tr>
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<td>-------------</td>
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<td>Partner Effect</td>
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<td>-0.061</td>
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</tr>
<tr>
<td>Actor Effect</td>
<td>-1.019</td>
<td>&lt; .05*</td>
<td>-0.703</td>
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<tr>
<td>Partner Effect</td>
<td>0.088</td>
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<td>0.060</td>
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<tr>
<td><strong>FQL Relational → PROMIS</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Actor Effect</td>
<td>-0.486</td>
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<td>-0.375</td>
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<td>Partner Effect</td>
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<td>0.599</td>
<td>-0.075</td>
</tr>
<tr>
<td><strong>FQL Total → FSCRS Inadequate</strong></td>
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<td></td>
<td></td>
</tr>
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<td>Actor Effect</td>
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<td>-0.345</td>
</tr>
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<td>Partner Effect</td>
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<td>0.073</td>
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<tr>
<td>Actor Effect</td>
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<tr>
<td>Partner Effect</td>
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</table>
Effect & Estimate & Sig. & Effect Size \\
--- & --- & --- & --- \\
**FQL Mind Body → FSCRS Reassured** & & & \\
Actor Effect & .527 & < .05* & .349 \\
Partner Effect & -.045 & .664 & -.030 \\
**FQL Emotional → FSCRS Reassured** & & & \\
Actor Effect & .568 & < .05* & .348 \\
Partner Effect & .014 & .885 & .008 \\
**FQL Social → FSCRS Reassured** & & & \\
Actor Effect & .718 & < .05* & .448 \\
Partner Effect & -.039 & .717 & -.024 \\
**FQL Relational → FSCRS Reassured** & & & \\
Actor Effect & .233 & .134 & .162 \\
Partner Effect & -.003 & .984 & -.002 \\

*Note. *Significant at $p < .05$

**Exploratory Research Question 2a**

What are the relationships among the demographic variables (i.e., gender, race, ethnicity, education, income, relationship length, infertility length, type of infertility, cause of infertility, and the scale questions including treatment access and the individual’s value of spirituality) and (a) fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [Boivin et al., 2011]), (b) relationship satisfaction (as measured by the *Couple Satisfaction Index* [Funk & Rogge, 2007]), (c) resilience (as measured by the *Connor–Davidson Resilience Scale* [Campbell-Sills & Stein, 2007]), (d) depression (as measured by the *PROMIS Depression Instrument* [Cella et al., 2010]), and (e) shame (as measured by the *Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [Gilbert et al, 2004])?

**Spearman’s Rank-Order Correlation (ρ)**

The researcher first assessed if there were relationships between fertility related quality of life, relationship satisfaction, resilience, depression, and shame with the participant’s reported demographic variables (i.e., gender, race, ethnicity, education, income, relationship length, infertility length, type of infertility, cause of infertility, and the scale questions including
treatment access and the individual’s value of spirituality) using a Spearman’s rank-order correlation (see Table 25). There were several significant relationships amongst the constructs and the demographic variables. Fertility related quality of life was strongly related to relationship satisfaction ($\rho = .390, p < .05$), resilience ($\rho = .412, p < .05$), depression ($\rho = -.716, p < .05$), shame-inadequate ($\rho = -.417, p < .05$), shame-hated ($\rho = -.488, p < .05$), and shame-reassured ($\rho = .415, p < .05$), which indicates that greater levels of fertility related quality of life were related to greater relationship satisfaction, greater resilience, less depression, and less shame.

Additionally, greater relationship satisfaction was related to greater resilience ($\rho = .224, p < .05$), less depression ($\rho = -.231, p < .05$), less shame-inadequate ($\rho = -.156, p < .05$), less shame-hated ($\rho = -.266, p < .05$), and greater shame-reassured ($\rho = .260, p < .05$). Similarly, greater resilience was related to less depression ($\rho = -.407, p < .05$), less shame-inadequate ($\rho = -.416, p < .05$), less shame-hated ($\rho = -.429, p < .05$), and greater shame-reassured ($\rho = .591, p < .05$), indicating that as one who is able to reassure themselves and offer themselves comfort amidst a stressful event, they may experience greater levels of resilience. Also, greater levels of depression were related to greater shame-inadequate ($\rho = .527, p < .05$), greater shame-hated ($\rho = .555, p < .05$), and less shame-reassured ($\rho = -.473, p < .05$), indicating that depression and shame may be experienced in tandem. As expected, greater shame-inadequate was related to greater shame-hated ($\rho = .759, p < .05$) and less shame-reassured ($\rho = -.660, p < .05$).

Regarding the demographic variables, results indicated that gender was significantly related to fertility related quality of life ($\rho = .248, p < .05$), resilience ($\rho = .193, p < .05$), depression ($\rho = -.199, p < .05$), shame-inadequate ($\rho = -.171, p < .05$), shame-hated ($\rho = -.153, p < .05$), and shame-reassured ($\rho = .197, p < .05$), which supports the need for further investigation in to gender differences amongst individuals experiencing infertility. Also, results indicated that
there was a significant relationship between race and spirituality ($\rho = .134, p < .05$), as well as race and relationship status ($\rho = -.089, p < .05$). Additionally, ethnicity was significantly related to resilience ($\rho = -.102, p < .05$), indicating that participants who identified as non-Hispanic experienced less resilience. Further, relationship status (i.e., married, committed relationship with cohabitation, committed relationship without cohabitation) was significantly related to relationship length ($\rho = .169, p < .05$), cause of infertility ($\rho = .098, p < .05$), and treatment access ($\rho = .106, p < .05$), indicating that couples who were married experienced longer relationship length and greater access to treatment. Type of infertility (i.e., primary, secondary, both) was significantly related to relationship satisfaction ($\rho = -.148, p < .05$) and cause of infertility ($\rho = .110, p < .05$), indicating that those who identified with more primary infertility had less relationship satisfaction.

Greater infertility length was significantly related to less fertility related quality of life ($\rho = -.174, p < .05$), less relationship satisfaction ($\rho = -.172, p < .05$), less resilience ($\rho = -.084, p < .05$), greater depression ($\rho = .207, p < .05$), greater shame-hated ($\rho = .115, p < .05$), greater spirituality ($\rho = .107, p < .05$), and less treatment access ($\rho = -.101, p < .05$). Lastly, participants indicated their level of treatment access on a Likert scale. Results indicated that participants who felt like they had greater access to treatment was related to greater fertility related quality of life ($\rho = .143, p < .05$), greater relationship satisfaction ($\rho = .152, p < .05$), greater resilience ($\rho = .142, p < .05$), less depression ($\rho = -.169, p < .05$), less shame-inadequate ($\rho = -.176, p < .05$), less shame-hated ($\rho = -.2128, p < .05$), and less shame-reassured ($\rho = .170, p < .05$). In sum, correlations allowed the researcher to review significant relationship amongst the constructs and demographic variables.
Table 25.

Spearman’s Rank-Order Correlation between Demographic Factors and Fertility Related Quality of Life, Relationship Satisfaction, Resilience, Depression, and Shame

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<td>.412**</td>
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<td>-.101*</td>
<td>-.062</td>
<td>1.00</td>
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</table>

Note. ** Correlation is significant at the .01 level (2-tailed). * Correlation is significant at the .05 level (2-tailed).
Exploratory Research Question 2b

What is the relationship between couples’ race and (a) fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]), (b) relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), (c) resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), (d) depression (as measured by the PROMIS Depression Instrument [Cella et al., 2010]), and (e) shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al., 2004])?

MANOVA

The majority of participants identified as Caucasian (n = 473), therefore the researcher compared Caucasian to Racially Diverse participants (n = 83) which allowed the researcher to test group differences using a MANOVA. Overall, there was a statistically significant difference in the scores of the constructs (i.e., fertility related quality of life, relationship satisfaction, resilience, depression, and shame) based on the participants’ race, $F = 2.323, p < .05$, Wilk’s $\lambda = .947$, partial $\eta^2 = .053$, indicating a medium effect size. Specifically, there was a significant group difference in relationship satisfaction with a very small effect size ($F = 5.03, p < .05, \eta^2 = .009$), evident by Caucasian participants scoring higher on relationship satisfaction ($M = 64.11, SD = 13.12$) than Racially Diverse participants ($M = 60.37, SD = 18.21$; see Table 26 and Figure 69). Also, there was a significant group difference in shame related to inadequacy with a very small effect size ($F = 3.73, p < .05, \eta^2 = .007$), evident by Caucasian participants scoring lower on shame related to inadequacy ($M = 18.30, SD = 7.85$) than Racially Diverse participants ($M = 20.12, SD = 8.30$; see Figure 70). Lastly, there was a significant group difference in the value of spirituality with a small effect size ($F = 9.11, p < .05, \eta^2 = .016$), evident by Racially Diverse
participants scoring higher on spirituality value ($M = 2.96, \ SD = 1.46$) than Caucasian participants ($M = 2.42, \ SD = 1.50$; see Figure 71). In sum, although the significant group differences between Caucasian and Racially Diverse participants were evident in relationship satisfaction, shame-inadequacy, and spirituality, the effect sizes were small, indicating that a larger sample size of Racially Diverse participants could greatly enhance the strength of the results.

Table 26.

*Means and Standard Deviations of Caucasian and Racially Diverse Group Differences*

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<th>Mean</th>
<th>SD</th>
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<tr>
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<td>Racially Diverse</td>
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<td>4.78</td>
</tr>
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<td>FQL Emotional</td>
<td>Caucasian</td>
<td>8.87</td>
<td>4.95</td>
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<td>Racially Diverse</td>
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</tr>
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<td>FQL Social</td>
<td>Caucasian</td>
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</tr>
<tr>
<td></td>
<td>Racially Diverse</td>
<td>12.00</td>
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Figure 69. Marginal Means of Relationship Satisfaction

Figure 70. Marginal Means of Shame Related to Inadequacy
In Chapter 4, the research presented the results of the data analysis. Specifically, the researcher reported data cleaning and screening efforts to test assumptions prior to the SEM and APIM analysis. Next, the researcher reported on the preliminary analysis and descriptive statistics, including responses rates, initial instrument psychometrics, and participant demographics. Participant demographics allowed the research to more accurately capture the qualities of the sample. Next, the primary research hypothesis was examined and tested through SEM, indicating a good model fit. Lastly, the researcher used APIM to test the first exploratory research question regarding the actor and partner effects, and Spearman’s rank-order correlation and multiple analysis of variance to test the secondary exploratory research question.
CHAPTER FIVE: DISCUSSION

Chapter Five provides a summary of the study and discussion of the findings. Specifically, this chapter includes a summary of the current study, methodology, and results of the primary research question and exploratory questions. The researcher provides a comparison of current results to previous studies for the constructs of interest. Additionally, the researcher explores limitations, recommendations for future research, and implications for counseling practice and counselor education.

Study Summary

Infertility affects approximately 12–15% of couples, exacting a huge emotional and psychological toll for those impacted. Researchers have found that both men and women with infertility tend to have significant levels of distress. In a foundational study including 200 couples at a fertility clinic, results indicated that 15% of the men and 50% of the women described infertility as “the most upsetting experience of their lives” (Freeman et al., 1985). It is important to note that infertility is more than just a biological issue. In fact, it affects the psychological, emotional, and relational aspects of an individual’s life (Shreffler et al., 2017; Wamser-Nanney, 2019; Ying & Loke, 2016). Given the relational aspect of infertility, the relationship amongst couples can be affected; hence, it is necessary to examine the experience of infertility through an integrated theoretical framework of the Biopsychosocial Theory of Infertility and the theory of Dyadic Coping.

Furthermore, fertility related quality of life has been associated with lower levels of relationship satisfaction, greater depression, and a greater sense of shame (Kim et al., 2018; Zurlo, 2018). Additionally, resilience has been found to mitigate symptoms of depression amidst stressful life events (Dolphin, Steinhardt, & Cance, 2015; Sharpley et al., 2020) making
resilience an important construct to consider. Further, couples with infertility tend to experience greater levels of shame, considering that many individuals view their inability to conceive as a failure within themselves (Ceballo et al., 2015; Galhardo et al., 201), compounding on the symptoms of depression.

This study investigated the hypothesized directional relationship between fertility related quality of life, relationship satisfaction, resilience, depression, and shame amongst individuals and couples with infertility through Structural Equation Modeling (SEM) and Actor Partner Interdependence Modeling (APIM). The final sample for this investigation included 556 individuals (female, n = 508; male, n = 47; nonbinary, n = 1) who self-identified with infertility for a minimum of six months. Participant data included: (a) a researcher-developed history and demographic form, (b) the Fertility Quality of Life Tool (FertiQol; Boivin et al., 2011), (b) the Couple Satisfaction Index (CSI; Funk & Rogge, 2007), (c) the Connor–Davidson Resilience Scale (CD-RISC; Campbell-Sills & Stein, 2007), (d) the PROMIS Depression Instrument (PROMIS Depression; Cella et al., 2010), and (e) The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale (FSCRS; Gilbert et al., 2004). The researcher conducted several preliminary analyses and employed several quantitative methods, including: (a) data screening and assumption testing, (b) descriptive statistics, (c) confirmatory factor analysis (CFA), (d) structural equation modeling (SEM), (e) actor partner interdependence modeling (APIM), (f) Spearman’s rank correlations, and (g) multivariate analysis of variance (MANOVA).
**Constructs of Interest**

This study focused on five primary constructs of interest. The constructs of interest, which previous studies indicated were related to infertility, include: (a) fertility related quality of life, (b) relationship satisfaction, (c) resilience, (d) depression, and (e) shame.

**Primary Research Question**

To what extent does fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [Boivin et al., 2011]) influence relationship satisfaction (as measured by the *Couple Satisfaction Index* [Funk & Rogge, 2007]), resilience (as measured by the *Connor–Davidson Resilience Scale* [Campbell-Sills & Stein, 2007]), depression (as measured by the *PROMIS Depression Instrument* [Cella et al., 2010]), and shame (as measured by *The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [Gilbert et al., 2004]).

**Exploratory Research Question 1**

What are the actor and partner effects amongst couples’ fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [Boivin et al., 2011]), relationship satisfaction (as measured by the *Couple Satisfaction Index* [Funk & Rogge, 2007]), resilience (as measured by the *Connor–Davidson Resilience Scale* [Campbell-Sills & Stein, 2007]), depression (as measured by the *PROMIS Depression Instrument* [Cella et al., 2010]), and shame (as measured by *The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [Gilbert et al, 2004])?

**Exploratory Research Question 2a**

What are the relationships among the demographic variables (i.e., gender, race, ethnicity, education, income, relationship length, infertility length, type of infertility, cause of infertility, and the scale questions including treatment access and the individual’s value of spirituality) and (a) fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [Boivin et al.,
2011]), (b) relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), (c) resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), (d) depression (as measured by the PROMIS Depression Instrument [Cella et al., 2010]), and (e) shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004])?

Exploratory Research Question 2b

What is the relationship between couples’ race and (a) fertility related quality of life (as measured by the Fertility Quality of Life Tool [Boivin et al., 2011]), (b) relationship satisfaction (as measured by the Couple Satisfaction Index [Funk & Rogge, 2007]), (c) resilience (as measured by the Connor–Davidson Resilience Scale [Campbell-Sills & Stein, 2007]), (d) depression (as measured by the PROMIS Depression Instrument [Cella et al., 2010]), and (e) shame (as measured by The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale [Gilbert et al, 2004])?

Descriptive Data Analysis

The researcher aimed to include individuals and couples who had experienced infertility for a minimum of six months. All recruitment occurred online with a strong emphasis on online social support groups primarily serving a diverse population. Data collection occurred during the Fall of 2020. Due to the COVID-19 pandemic, all data collection occurred online. Response rates were calculated by clicks to the website (2,151) compared to completed surveys (556), yielding a 25.8% response rate. There were 16 relevant demographic variables in the current study, consistent with previous research, including (a) age, (b) gender (c) race, (d) ethnicity, (d) education, (e) household income, (f) rural or urban living, (g) employment status, (h) geographic location, (i) relationship status, (j) impact of infertility on relationship status (k) length of
relationship, (l) length of time experiencing self-identified infertility (inclusion/exclusion question), (m) type of infertility, (n) cause of infertility, (o) if the couple had sought professional help for their relationship (mental health, marriage and family, psychology), and (p) if the couple has sought medical help for their infertility.

Data collection resulted in a final sample size of 556 participants. The majority of participants identified as female \( (n = 508; 91.4\%) \) compared to those who identified as male \( (n = 47; 8.5\%) \). The mean age of participants was 32 years old \( (SD = 4.8) \). The majority of participants identified their ethnicity as Non-Hispanic or Latino \( (n = 519; 93.3\%) \) and Caucasian \( (n = 473; 85.1\%) \) compared to other participants who identified as Multiracial \( (n = 28; 5\%) \), Asian \( (n = 28; 5\%) \), Black/African American \( (n = 16; 2.9\%) \), Other \( (n = 8; 1.4\%) \), American Indian/Alaskan Native \( (n = 3; .5\%) \). Related to relationship status, most participants identified as married \( (n = 514; 92.4\%) \), followed by in a committed relationship with cohabitation \( (n = 39; 7\%) \) and without cohabitation \( (n = 3; .5\%) \), with a relationship length of 1-3 years \( (n = 34; 6.1\%) \), 4-6 years \( (n = 144; 25.9\%) \), 7-10 years \( (n = 192; 34.5\%) \), and greater than 10 years \( (n = 186; 33.5\%) \). Related to infertility variables, participants disclosed their type of infertility as primary \( (n = 501; 90.1\%) \), secondary \( (n = 47; 8.5\%) \), or both \( (n = 8; 1.4\%) \) as well as the cause of their infertility as female factor \( (n = 197; 35.4\%) \), male factor \( (n = 62; 11.2\%) \), both female factor and male factor \( (n = 66; 11.9\%) \), unexplained \( (n = 187; 33.6\%) \), or unknown \( (n = 44; 7.9\%) \) (See Chapter 4 for complete summary of descriptive data analysis). The participant demographics from the current study are similar to previous studies (Boivin et al., 2011).
Instrument Descriptive Statistics

The researcher used five instruments to measure the primary constructs in this study. To measure the participant’s level of fertility related quality of life, the researcher used the FertiQol (Boivin et al., 2011). The CSI (Funk & Rogge, 2007) measured relationship satisfaction. The CD-RISC (Campbell-Sills & Stein, 2007) measure participant’s level of resilience. The PROMIS Depression instrument (Cella et al., 2010) measured depression. The FSCRS (Gilbert et al., 2004) measured participant’s degree of shame related to inadequacy, self-hatred, and reassurance. The researcher conducted CFAs for each of the instruments to assess the factor structure and identify the best fitting measurement models. Most of the instruments (i.e., FertiQol, CSI, CD-RISC, FSCRS) demonstrated good fitting models; however, the PROMIS Depression instrument did not yield an acceptable fit. Hence, the researcher made modifications to the PROMIS Depression instrument through item deletion, which resulted in an acceptable fitting measurement model. Therefore, the researcher identified the best fitting measurement model for each instrument. The following table outlines the overall reliability and model fit of each instrument (See Chapter 4 for complete summary of instrument statistics).
Table 27.

Instrument Statistics

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Discussion of the Findings

The following section includes: (a) preliminary research, (b) primary research results, (c) exploratory research results. The primary research section includes results from the structural equation model (SEM). The exploratory research section includes dyadic results from the actor-partner interdependence model (APIM), Spearman’s rank correlations amongst study constructs and demographic variables, and multivariate analysis of variance (MANOVA) between race and the study constructs.

Preliminary Research

Preliminary analysis included data cleaning and screening to test statistical assumptions (Hahs-Vaughn, 2017). Preliminary analysis included: (a) assessing sample size, (b) tests of linearity, (c) tests of univariate and multivariate outliers, (d) tests of univariate and multivariate normality, (e) tests of heteroscedasticity and multicollinearity, and (f) preliminary dyadic analysis. Results indicated that an acceptable sample size was acquired to identify a small effect size (0.2) at a high power (0.8) with five latent variables and ten manifest variables at the
probability of $p < .05$. Also, there was no missing data, the assumption of linearity was met, and results did not indicate any issue with multicollinearity. Next, considering univariate outliers is common in the social sciences (Hahs-Vaughn, 2017), the seven outliers were not removed. Alternatively, the assumption of normality and heteroscedasticity was not achieved. Lastly, the researcher conducted the preliminary dyadic analysis, which included ANOVA intraclass correlation to tests non-independence. Considering the dyads were indistinguishable, due to the presence of same sex couples, the results of the intraclass correlation indicated that the dyads met the assumption of non-independence ($ICC = .565, p < .001$).

**Primary Research Hypothesis**

The research hypothesis for this study was: Couples experiencing infertility with higher levels of fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [Boivin et al., 2011]) will have increased relationship satisfaction (as measured by the *Couple Satisfaction Index* [(Funk & Rogge, 2007)], increased resilience (as measured by the *Connor–Davidson Resilience Scale* [Campbell-Sills & Stein, 2007]), decreased depression (as measure by the *PROMIS Depression Instrument* [Cella et al., 2010]), and decreased shame (as measured by *The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [FSCRS; Gilbert et al, 2004]) with gender as a covariate.

**Primary Research Hypothesis Results**

The original theorized model consisting of fertility related quality of life (observed by *mind body, emotional, social, and relational* FertiQol subscales) predicting relationship satisfaction (observed by the CSI’s *sixteen* indicators), resilience (observed by the CD-RISC’s *ten* indicators), depression (observed by the PROMIS’s modified *four* indicators), and shame (observed by *inadequate self, hated self, and reassured self* FSCRS subscales) succeeded in
converging, however the model demonstrated a poor fit: $\chi^2/df = 5.36$, $p = .000$; CFI = .810; TLI = .796; RMSEA = .089; SRMR = .098. After inspecting the results, the researcher identified that the tenth question on the resilience scale (i.e., CDR10) and the sixteenth question on the relationship satisfaction scale (i.e., RS16) correlated too strongly (388.203) likely due to a method effect (Kline, 2016). Hence, the researcher correlated CDR10 and RS16. Subsequently, the updated model (i.e., model modification 1) resulted in a slightly better, yet still not acceptable model fit: $\chi^2/df = 3.71$, $p = .000$; CFI = .882; TLI = .873; RMSEA = .070; SRMR = .095. Next, the researcher identified that the path from fertility related quality of life to relationship satisfaction resulted in a small estimate ($\beta = .235$), while the Relational aspect of fertility related quality of life was strongly associated with relationship satisfaction ($\beta = .758$). After examining theory (Gerrity, 2001), the researcher determined that the Relational subscale could be parsed out from the construct fertility related quality of life and stand alone as a second predictor variable for this population. The overall goodness of fit for the updated model (i.e., model modification 2) yielded an acceptable fit: $\chi^2/df = 3.06$, $p = .000$; CFI = .911; TLI = .904; RMSEA = .061; SRMR = .073. The updated model indicated that once the Relational aspect of fertility related quality of life was determined as a second predictor variable, there was a strong and significant path from the Relational subscale to relationship satisfaction ($b = .158; \beta = .771; p = .000$) with a large effect size. However, the relative Chi-Square ($\chi^2/df$) was still not acceptable. The researcher updated the model to include additional correlations between two relationship satisfaction items that were highly related (i.e., RS12 and RS15; 74.864) and two resilience items that were highly related (i.e., CDR1 and CDR2; 68.127). The updated model (i.e., model modification 3) indicated a good fit: $\chi^2/df = 2.83$, $p = .000$; CFI = .921; TLI = .914; RMSEA = .058; SRMR = .072. The path from the fertility related quality of life construct to the
following constructs were significant: (a) resilience was significant and positive ($b = .055; \beta = .453; p = .000$) with a medium effect size (b) depression was significant and negative ($b = -.145; \beta = -.800; p = .000$) with a large effect size, and (c) shame was significant and negative ($b = -.798; \beta = -.490; p = .000$) with a medium effect size. The path from fertility related quality of life to relationship satisfaction was not significant ($b = .000; \beta = -.002; p = .961$). Further, the Relational subscale significantly and positively predicted relationship satisfaction ($b = .158; \beta = .773; p = .000$) with a large effect size, and depression ($b = -.013; \beta = -.088; p = .000$) with a very small effect size.

Next, the researcher included gender as covariate in the model. The overall goodness of fit for the structural model with gender as a covariate was good: $\chi^2/df = 2.86, p = .000; \text{CFI} = .916; \text{TLI} = .909; \text{RMSEA} = .058; \text{SRMR} = .075$. Results indicated that gender significantly ($p < .05$) influenced resilience ($b = .144; \beta = .309; p = .031$) with a small effect size, indicating that men tended to have greater resilience than women. In sum, the model with gender as a covariate and the relational aspect of fertility related quality of life as an additional independent variable increased model fit and provided clearer results, as the relational aspect of fertility related quality of life primarily predicted relationship satisfaction. Also, the model confirmed the research hypothesis that fertility related quality of life influenced relationship satisfaction, resilience, depression, and shame in individuals and couples with infertility.

**Exploratory Research Question 1**

What are the actor and partner effects amongst couples’ fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [Boivin et al., 2011]), relationship satisfaction (as measured by the *Couple Satisfaction Index* [Funk & Rogge, 2007]), resilience (as measured by
the *Connor–Davidson Resilience Scale* [Campbell-Sills & Stein, 2007]), depression (as measured by the *PROMIS Depression Instrument* [Cella et al., 2010]), and shame (as measured by *The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [Gilbert et al, 2004])?

Actor-partner interdependence modeling (APIM) was utilized to test the dyadic relationships. Direct actor effects refer to the level that one partner’s change in their own independent variable (i.e., fertility related quality of life) effects their own outcome variable (i.e., relationship satisfaction, resilience, depression, and shame). Alternatively, the direct partner effect refers to the level that one partner’s (i.e., partner a) change in their own independent variable (i.e., fertility related quality of life) effects the other partner’s (i.e., partner b) outcome variable (i.e., relationship satisfaction, resilience, depression, and shame). APIM results indicated that there were both direct actor effects and direct partner effects. Results from the first exploratory question indicated significant actor and partner effects associated with fertility related quality of life.

**Actor Effects**

Results indicated significant actor effects from fertility related quality of life on shame-inadequacy ($\beta = -.259$, $p < .05$) with a small effect size, meaning that less fertility related quality of life meant more feelings of inadequacy related to shame for the individual. Additionally, there was a significant actor effect from fertility related quality of life on depression ($\beta = -.383$, $p < .05$) with a small effect size, meaning less fertility related quality of life meant more symptoms of depression for the individual. Next, there was a significant actor effect from fertility related quality of life on relationship satisfaction ($\beta = .244$, $p < .05$) with a small effect size, meaning more fertility related quality of life meant more relationship satisfaction for the individuals. Further, the emotional aspect of fertility related quality of life had a significant actor effect on
resilience ($\beta = .389, p < .05$) with a small effect size, meaning feeling *more* positive emotions associated with fertility related quality of life, *more* resilience for the individual. Lastly, the largest actor effect with a medium effect size ($\beta = .526, p < .05$) was from the mind body aspect of fertility related quality of life on resilience, indicating that individuals who have *more* mind body understanding and connected associated with infertility, experienced *more* resilience.

Significant actor effects further support the impact that infertility distress and low fertility related quality of life have on shame, depression, relationship satisfaction, and resilience (See Chapter 4 for a thorough review of significant actor effects).

**Partner Effects**

Results indicated two significant partner effects. The first significant partner effect was from the relational aspect of fertility related quality of life on relationship satisfaction ($\beta = .053, p < .05$) with a very small effect size. Although the effect size indicates that the result is trivial, the presence of the partner effect indicates a need for further research. Nevertheless, a significant partner effect from the relational aspect of fertility related quality of life on relationship satisfaction means that as *one partner* experiences *more* fertility related quality of life, as determined by positive feelings towards the relationship, the *other partner* experiences *more* relationship satisfaction. The second partner effect was from relational aspect of fertility related quality of life on self-hatred shame satisfaction ($\beta = -.188, p < .05$) with a small effect size. A significant partner from the relational aspect of fertility related quality of life on self-hatred shame means that as *one partner* experiences *less* fertility related quality of life, as determined by positive feelings towards the relationship, the *other partner* experiences *more* feelings of self-hatred and shame. Considering that previous infertility studies have found that shame inhibits the individual from connecting to their partner (Ceballo et al., 2015), this partner effect is valuable in
beginning to understand how one partner’s experience of infertility can impact the other partner’s feelings of shame.

**Exploratory Research Question 2a**

What are the relationships among the demographic variables (i.e., gender, race, ethnicity, education, income, relationship length, infertility length, type of infertility, cause of infertility, and the scale questions including treatment access and the individual’s value of spirituality) and (a) fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [Boivin et al., 2011]), (b) relationship satisfaction (as measured by the *Couple Satisfaction Index* [Funk & Rogge, 2007]), (c) resilience (as measured by the *Connor–Davidson Resilience Scale* [Campbell-Sills & Stein, 2007]), (d) depression (as measured by the *PROMIS Depression Instrument* [Cella et al., 2010]), and (e) shame (as measured by *The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [Gilbert et al, 2004])?

Spearman’s rank correlations indicated several significant relationships among constructs and demographics variables (See Chapter 4 for a thorough review of significant correlations). Fertility related quality of life, relationship satisfaction, resilience, depression, and shame were correlated with each other. Also, the following demographic variables were significantly correlated with the constructs: (a) gender, (b) ethnicity, (c) type of infertility, (d) infertility length, and (e) treatment access (See Table 28).
Table 28.

Spearman’s Rank-Order Correlation between Demographic Factors and Fertility Related Quality of Life, Relationship Satisfaction, Resilience, Depression, and Shame

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Note. ** Correlation is significant at the .01 level (2-tailed). * Correlation is significant at the .05 level (2-tailed).
Exploratory Research Question 2b

What is the relationship between couples’ race and (a) fertility related quality of life (as measured by the *Fertility Quality of Life Tool* [Boivin et al., 2011]), (b) relationship satisfaction (as measured by the *Couple Satisfaction Index* [Funk & Rogge, 2007]), (c) resilience (as measured by the *Connor–Davidson Resilience Scale* [Campbell-Sills & Stein, 2007]), (d) depression (as measured by the *PROMIS Depression Instrument* [Cella et al., 2010]), and (e) shame (as measured by *The Forms of Self-Criticizing/Attacking and Self-Reassuring Scale* [Gilbert et al, 2004])?

Due to the small sample size of each race: (a) American Indian or Alaska Native (n = 3), (b) Asian (n = 28), (c) Black or African American (n = 16), (d) Bi-racial/Multiracial (n = 28), (e) Native Hawaiian or other Pacific Islander (n = 0), and (f) Other (n = 8), the researcher grouped the races into one group labeled “Racially Diverse” (n = 83). The researcher then used multivariate analysis of variance (MANOVA) to investigate group differences between the Racially Diverse group and the Caucasian group (n = 473). Results from the MANOVA indicated that overall there was a statistically significant difference in the scores of the constructs (i.e., fertility related quality of life, relationship satisfaction, resilience, depression, and shame) based on the participants’ race ($F = 2.323, p < .05$, Wilk’s $\lambda = .947$, partial $\eta^2 = .053$) with 53% of the variance explained and a small to medium effect size. Additionally, there was a significant group difference in relationship satisfaction ($F = 5.03, p < .05$, $\eta^2 = .009$) with 9% of the variance explained by group differences and small effect size. Specifically, Caucasian participants scored higher ($M = 64.11, SD = 13.12$) on relationship satisfaction than Racially Diverse participants ($M = 60.37, SD = 18.21$). Also, there was a significant group difference in shame related to inadequacy ($F = 3.73, p < .05$, $\eta^2 = .007$) with 7% of the variance explained by
group differences and a very small effect size. Specifically, Caucasian participants scored lower ($M = 18.30, SD = 7.85$) on shame related to inadequacy than Racially Diverse participants ($M = 20.12, SD = 8.30$). Lastly, there was a significant group difference in value placed on spirituality ($F = 9.11, p < .05, \eta^2 = .016$) with 16% of the variance explained by group differences and a small effect size. Specifically, Racially Diverse participants placed more value on spirituality ($M = 2.96, SD = 1.46$) than Caucasian participants ($M = 2.42, SD = 1.50$).

In sum, results are limited as the sample size of Racially Diverse participants was small. Also, given the diversity amongst the various races in the Racially Diverse group, there is limited generalizability. Nevertheless, the results indicated that there were significant group differences on relationship satisfaction, shame, and spirituality. Although, further research is needed to understand the differences in these constructs between individual races, the results indicate the differences do exist, which should inform counseling practices when working with diverse clients. The following section outlines study limitations, implications, and suggested topics for future research.

**Limitations**

Several limitations deserve consideration in this study. Interpreting results in light of related limitations is necessary. Specifically, the current study had the following limitations: (a) research design, (b) sampling procedures, and (c) instrumentation. The following section includes an exploration of study limitation.

**Research Design**

The current study utilized a descriptive, correlational research design, using survey research, which inherently increases limitations of internal and external validity (Gall et al., 2007). Specifically, research design limitations include: (a) self-report surveys, (b) causality, and
(c) extraneous variables. Survey research relies on the self-report of the participant with answers restricted to fixed responses, which inhibits the participant from expounding on their answers. Also, survey research is vulnerable to social desirability bias. The researcher attempted to mitigate the potential for social desirability bias by including a social desirability measure; however, the measure proved to be invalid and not an accurate test for measuring participant social desirability. Although the researcher removed the social desirability instrument from the analysis, the researcher assessed participant scores across constructs to determine outliers and if scores were consistent across constructs, which they were. An additional limitation to research design is the lack of causality due to the temporal antecedence condition, which refers to the independent variable occurring prior to the dependent variable (Gall et al., 2007). Although the researcher was unable to safeguard against the threat of temporal antecedence, the correlational design and advanced statistical analysis allowed the researcher to explore potential causal relationships (i.e., direction and strength) between variables to predict how one variable influences another variable. Also, this study was unable to control for all extraneous variables, which are unaccounted for variables that may influence the outcome variables. To mitigate the potential effect of extraneous variables, the research expanded the demographic questionnaire to capture extensive demographic information related to the constructs (i.e., length of relationship, length of infertility, income, treatment access etc.) and tested each variable as a potential covariate. Lastly, considering the researcher collected all data through an online platform and wanted to ensure that people and not machines were completing the survey, the researcher included a captcha at the end of the demographic form. Although there were limitations inherent to the research design, the researcher attempted to mitigate the threats to validity. Therefore, the
researcher cautiously interpretated results that indicated potential cause and effect (i.e., predictive) relationships (Gall et al., 2007).

**Sampling**

Sampling limitations are comprised of factors effecting external validity, including population validity and ecological validity (Johnson & Christensen, 2014). Population generalizations require a large and diverse sample (Hahs-Vaughn, 2017). Also, although random sampling increases population generalization, convenience sampling is constituted a satisfactory approach (Gall et al., 2007). Consequently, the researcher utilized convenience sampling to target a very specific sample. Further, to ensure that the population of interest who met the inclusion criteria was participating in the study, the researcher included specific demographic questions to test inclusion requirement (i.e., infertility experienced less than 6 months). Also, the majority of the participants in the study were female and Caucasian, hence, the results of this study may not be generalizable to all adults experiencing infertility in the U.S. or other countries.

Ecological validity, the ability to generalize the results from the investigation to other settings, may be influenced by environmental factors (Gall et al., 2007). Considering that data collection for this investigation occurred from September 2020 through November 2020, which was during the COVID-19 pandemic, it is necessary to consider the impact of the environment on the results. It is unknown how the timing of the study may have influenced the results, which led the researcher to consider how the presence of the pandemic may have impacted the participant self-report scores (i.e., depression). However, the results of the current investigation were in line with previous studies that measure depression and relationship satisfaction in participants with infertility (James & Singh, 2019; Meller et al., 2002; Sultan et al., 2018), which provides confidence in the current interpretation of the results.
Instrumentation

This investigation relied on five self-report measures. Instrumentation is a common threat to internal validity, considering the instruments used in the study may not measure constructs perfectly (Johnson & Christensen, 2014). Therefore, to safeguard against the instrumentation threat to internal validity, the researcher extensively evaluated psychometrics of all instruments used in the study. Although each instrument’s items yielded strong internal consistency, self-report instruments have the inherent limitations of social desirability bias and incorrect (i.e., random, desirable, or false) responses (Johnson & Christensen, 2017). Lastly, although the researcher selected established instruments, all instruments contain some level of measurement error, hence, the researcher tested each individual measurement model to identify model fit and address this instrumentation limitation (Gall et al., 2007). Nevertheless, all instruments are susceptible to instrumentation limitation, and although viewed as problematic, survey research is the most regularly used research method (Dillman et al., 2014).

Implications

Implications for Couples with Infertility

The results from this study confirm previous findings that infertility can significantly impact the couple relationship (Greil et al., 2018). This study found that fertility related quality of life influences an individual’s level of relationship satisfaction, resilience, depression and shame. Specifically, greater levels of fertility related quality of life are connected to more relationship satisfaction and greater resilience, while lesser levels of fertility related quality of life are connected to more depression and more shame. Relationship satisfaction has been found to mitigate against the effects of depression (Maroufizadeh et al., 2018), which is common amongst individuals with infertility. In fact, results indicated partner effects between the relational aspect
of fertility related quality of life and relationship satisfaction, meaning that one partner’s relational quality of life can impact the other partner’s level of relationship satisfaction. Additionally, shame can negatively impact an individual’s mental health as well as a couple relationship, which makes shame an important issue to consider. Individuals tend to keep the pain of their infertility private from their partner due to feelings of shame (Ceballo et al., 2015; Taylor et al., 2018), compounding on the feelings of depression and loneliness. The results from this study indicate that there are partner effects related to self-hatred shame, meaning that the level of relational quality of life experienced by one partner can decrease shame in the other partner, and vice versa. Further, considering partner effects can often be more challenging to identify, especially in small sample sizes, the presence of partner effects within this small sample supports the need for further research with a larger sample (Tambling et al., 2011). Hence, since research illustrates that shame is tightly connected to depression, it is necessary that couples learn to express their experiences related to infertility with their partners as a way to promote resiliency and relationship satisfaction.

Considering couples with infertility face a unique set of stressors related to their infertility, which can impact their overall quality of life, it is necessary that couples receive adequate support and treatment. Furthermore, previous research and the current study highlight the need for couples to learn positive ways to cope together, while maintaining emotional connection and relationship satisfaction, to offset the stressful experience of infertility (Kim et al., 2018; Greil et al., 2018). Results from this study can support relationship education for couples experiencing infertility to promote growth fostering relationships and enhance protective factors, offsetting depression and shame. Relationship education on how infertility can impact the relationship, as well as strategies for working through the stressful experience of infertility, may be beneficial. Further, participants (38.5%) indicated that they did not seek any mental health or marriage and family counseling,
which could benefit their relationship. Thus, access to treatment and relationship education, with counselors trained to address the nuance of infertility in the couple relationship, could greater benefit those experiencing infertility with their partner.

The Role of Shame

Previous studies have discovered the impact of shame on couples with infertility, however, this study is the first to quantitatively measure the influence of fertility related quality of life on shame. Shame accounted for 24.01% of the variance in fertility related quality of life, meaning that shame is a valuable component in understanding quality of life in individuals with infertility. Further, the results indicate that higher levels of infertility distress predict higher levels of shame with a medium effect ($\beta = -.472, p < .05$). Shame, defined as “an intensely painful feeling or experience of believing we are flawed and therefore unworthy of acceptance and belonging…creates feelings of fear, blame and disconnection” (Brown, 2006, p. 45). The feeling of shame has played a significant role in individuals and couples experiencing infertility (Ceballo et al., 2015; Taylor, 2018). Shame causes the individual to be silent about the depth of their painful experience with infertility, leaving one feeling isolated and unable to emotionally connect with others about their infertility (Ceballo et al., 2015). Additionally, a significant actor effect ($\beta = -.259, p < .05$) with a small effect from fertility related quality of life on shame-inadequacy further supports the impact that infertility distress and low fertility related quality of life have on shame and feelings of inadequacy. Partner effects revealed that the relational aspect of fertility related quality of life for one partner can effect the level of self-hatred shame in the other partner with a small effect ($\beta = -.188, p < .05$). The partner effect means that the more one partner feels negatively about the relationship in the context of infertility, the more self-hatred shame the other partner experiences. Thus, enhancing relationship quality for couples
experiencing infertility is pivotal for reducing self-hatred and shame. Further, self-hatred shame is moderately correlated with depression ($\rho = .555$), meaning that shame and depression tend go in tandem. Hence, addressing the couple’s infertility distress, relationship quality, and fertility related quality of life can influence each partner’s level of shame, which can then decrease symptoms of inadequacy, self-hatred, and depression.

Results indicate that shame is a valuable construct to consider in couples with infertility. Shame may inhibit clients from readily disclosing their infertility, hence understanding the role of shame in couples with infertility would greatly benefit counselors, inform integrative health, enhance screening for infertility in medical settings, and improve psychoeducation for couples. Top priority is educating couples on the presence and impact of shame, including how shame may make it more difficult to emotionally connect with their partner as well as how shame increases depression. Once partners can understand the detrimental impact of shame, they can then take steps to support each other. Consequently, as couples emotionally process their shame related to infertility, the couple’s relational quality may improve.

**Depression and Infertility**

Results of the current study regarding the impact of infertility on depression is consistent with previous findings (James & Singh, 2018; Zurlo, 2018). Depression accounted for 64% of the variance in fertility related quality of life, indicating a significant component of fertility quality of life is explained by depression. Further, results indicate that higher levels of infertility distress predict higher levels of depression with a large effect size ($\beta = -.800, p < .001$). Symptoms of depression include sadness, guilt, self-criticism, loneliness, feeling a lack of purpose, and a loss of interest in connecting with others (Cella et al., 2010). Further, infertility increases the risk of depression (Wamser-Nanney, 2019). Hence, the researcher examined actor effects to investigate
the effect of infertility distress on depression. A significant actor effect with a small effect size ($\beta = .383; p < .05$) from fertility related quality of life on depression, further supports the impact that infertility distress has on symptoms of depression. Further, depression was strongly correlated with fertility related quality of life ($\rho = -.716, p < .01$), meaning that as an individual experiences more infertility distress, they tend to experience more depression. Also, depression had a significant and moderate correlation with shame ($\rho = .555, p < .01$). Hence, as an individual with infertility experiences more depression, they also tend to experience more shame, which is consistent with previous findings (Trindade et al., 2018). Trindade and colleagues (2018) found a significant and large positive relationship between shame and depression ($r = .68, p < .001$), indicating that individuals who experience more shame, tend to experience more depression. The relationship between depression and shame indicates that individuals with infertility tend to have more shame and more depression, which can compound on each other and impact the treatment process in counseling. It is imperative that counselors understand the relationship between depression and shame to effectively treat them in conjunction with one another. Depression also had a significant and moderate correlation with resilience ($\rho = -.407, p < .01$) and a significant yet weak correlation with relationship satisfaction ($\rho = -.231, p < .01$). Hence, as an individual with infertility experiences more depression, they tend to experience less resilience and less relationship satisfaction, which suggests that counseling approaches that are aimed at increasing resilience and enhancing relationship quality may in fact decrease symptoms of depression. Additionally, it is important to note that depression was also significantly but weakly correlated with gender ($\rho = -.171, p < .01$), treatment access ($\rho = -.169, p < .01$), and length of infertility ($\rho = .207, p < .01$), meaning that women who have experienced infertility for a greater length of time and experience less access to treatment tend to experience more depression. Zurlo (2018) also found a significant
relationship between the length of infertility and the severity of depression. The results from Zurlo’s (2018) study indicated through logistic regression analysis that a greater duration of infertility (> 3 years) revealed significantly increased depression in men (β = .456, p < 0.01) and women (β = .561, p < 0.01) with a medium effect size. In sum, the results from this study indicate that depression is the most largely predicted outcome of individuals with infertility, especially if the individual is female. Further, the greater length of time individuals experience infertility, the more depression they may feel. The implications related to the influence of infertility distress on depression extend to couples counselors, counselors working in medical settings, medical personnel screening for infertility, and psychoeducation. Depression can become a very serious mental health condition; hence, addressing symptoms of depression in individuals with infertility through various modes may provide the education and insight necessary for both the individual and the couple. In addition to counselor training on the presence of depression in individuals with infertility, education on depression for medical personnel working with infertility issues can inform their assessments and resources provided to patients. In sum, given the prevalence of depression amongst individuals with infertility, addressing symptoms of depression is paramount.

**Partners Impact Each Other**

The current study’s theoretical framework included the Theory of Dyadic Coping, which posits that partners can work together to optimally deal with a combined stressor (Bodenmann, 1995). Specifically, infertility would be viewed as a dyadic stressor, considering it is a stressful event or experience that affects both partners in the relationship, either directly or indirectly (Bodenmann, 1995; Kayser & Bodenmann, 2005). The current study investigated the infertility partner effects, meaning how much one partner’s infertility distress or fertility related quality of life affects the other partner. The results indicated that there were two significant partner effects.
First, there was a significant but very small effect from the relational aspect of fertility related quality of life on relationship satisfaction ($\beta = .05$, $p < .05$), which indicated that the less relational fertility related quality of life one partner feels, the less relationship satisfaction the other partner feels. Second, there was a significant and small effect from the relational aspect of fertility related quality of life on self-hatred shame ($\beta = -.188$, $p < .05$), which indicated that the less relational fertility related quality of life one partner feels, the more self-hatred shame the other partner feels.

The finding that one partner’s feelings about the relationship in the context of infertility can either increase or decrease the other partner’s relationship satisfaction and feelings of self-hatred shame, demonstrates interdependence amongst the constructs. The knowledge that partners with infertility affect each other’s relationship satisfaction and shame can inform future interventions geared towards providing relationship education and enhancing relationship quality. Although relationship education programs already exist, the finding that fertility related quality of life in one partner effects the amount of shame in the other partner highlights a unique need in relationships for those experiencing infertility. Shame education and knowledge of partner effects integrated into relationship education would provide opportunities for couples with infertility to address their infertility distress and related shame with their partners.

**Relationship Satisfaction Alleviates Infertility Distress**

Results of the current study regarding the impact of infertility on relationship satisfaction is consistent with previous findings (Gana & Jakubowska, 2016; Greil et al., 2018; Maroufizadeh et al., 2018). Relationship satisfaction accounted for 59.75% of the variance in the relational aspect of fertility related quality of life, indicating that a large percentage of relationship satisfaction in individuals with infertility can be explained by the relational aspect of fertility related quality of life. Further, results indicate that higher levels of relational fertility related quality of life predict
higher levels of relationship satisfaction with a large effect size ($\beta = .773, p < .001$). A previous study by Gana and Jakubowska (2016) also found that relationship satisfaction was predicted by the amount of infertility distress ($\beta = -.255, p < .001$) except with a small effect size, meaning that more infertility distress predicted less relationship satisfaction. Also, Greil and Colleagues (2018) found through path analysis that female partners with less infertility distress have significantly more relationship satisfaction ($\beta = .177, p < .05$) with a small effect size, also supporting that relationship satisfaction is influenced by infertility distress or fertility related quality of life.

Relationship satisfaction can operate as a protective factor considering individuals in cohesive and secure relationships can experience an increase in positive benefits when faced with the adversity of a health crisis (Peterson et al., 2003). A significant actor effect with a small effect size ($\beta = .244; p < .05$) from the relational aspect of fertility related quality of life on relationship satisfaction further supports the impact that fertility related quality of life can have on relationship satisfaction. Further, relationship satisfaction was moderately correlated with fertility related quality of life ($\rho = .390, p < .01$), meaning that as an individual experiences more fertility related quality of life, they tend to experience more relationship satisfaction. Additionally, there were significant but weak relationships between relationship satisfaction and the following constructs: (a) resilience ($\rho = .224, p < .01$), (b) self-reassurance ($\rho = .260, p < .01$), (c) self-hatred shame ($\rho = -.266, p < .01$), and (d) depression ($\rho = -.231, p < .01$). These correlations indicate that as the individual experiences more relationship satisfaction, they tend to experience more resilience, more self-reassurance, less self-hatred shame, and less depression. The association between relationship satisfaction and resilience is consistent with previous findings, as Li and colleagues (2020) also found a small and significant relationship between
relationship satisfaction and resilience ($r = -.266$). Also, Li and Johnson (2018) found that both men ($\beta = -.39; p < .05$) and women ($\beta = -.28; p < .05$) who experienced greater relationship satisfaction, also experienced less depression with small effect size.

Considering that relationship satisfaction can be significantly influenced by fertility related quality of life, future interventions designed to enhance relationship quality in couples with infertility can specifically address fertility related quality of life, including the social, emotional, mind-body, and relationship aspects. Further, relationship satisfaction can be a protective factor for couples with infertility, evidenced by how an increase in relationship satisfaction is related to a decrease in shame and depression. Hence, counselors as well as future interventions can strategically focus on enhancing a couple’s relationship satisfaction to promote positive and long-lasting effects on the couple’s ability to deal with the stressor of infertility.

**Racial Diversity and Infertility**

The current study investigated group differences between Caucasian participants ($n = 473$) and Racially Diverse participants ($n = 83$). Results indicated that there were statistically significant group differences across the scores of the constructs (i.e., fertility related quality of life, relationship satisfaction, resilience, depression, and shame) based on participant race ($F = 2.323$, $p < .05$, Wilk’s $\lambda = .947$, partial $\eta^2 = .053$) with 53% of the variance explained and a small effect size. Specifically, relationship satisfaction ($F = 5.03$, $p < .05$, $\eta^2 = .009$), shame related to inadequacy ($F = 3.73$, $p < .05$, $\eta^2 = .007$), and value of spirituality ($F = 9.11$, $p < .05$, $\eta^2 = .016$) were statistically significant with small effects. Further, Racially Diverse participants experienced less relationship satisfaction, more shame related to inadequacy, and placed more value on spirituality. Although the effect sizes are small, these results indicate that there are significant group differences and further research is necessary to understand the influence of race on the
experience of infertility. Additionally, future research should parse out the individual races to better learn where the differences lie. Previous researchers have utilized qualitative inquiry to investigate the unique needs of diverse couples with infertility (Ceballo et al., 2015; Taylor et al., 2018), yet this is the first study to quantitatively measure the group differences between Caucasian participants and Racially Diverse participants. Specifically, previous studies have found that diverse couples with infertility tend to experience more shame and stigma related to their infertility. Considering that feelings of shame and stigma may be greater in diverse couples, perhaps that shame and stigma may be one factor that contributed to a lower sample size of diverse couples. Hence, future studies should use more face-to-face recruitment methods and build more lasting relationships with diverse communities prior to sampling.

Nevertheless, results from this study indicated that there were significant group differences related to participants’ race and the value of spirituality, relationship satisfaction, and shame in individuals with infertility. Previous studies have found that there are, in fact, large disparities between Caucasian women and Racially Diverse women when it comes to infertility prevalence and treatment (Dieke et al., 2017; Quinn & Fujimoto, 2016). Specifically, Chin and colleagues (2015) found that Caucasian, non-Hispanic women were more likely to receive treatment for their infertility, compared to other races and ethnicities. There are many barriers to infertility treatment, including health insurance, poor access to health care, discrimination, and sociocultural factors (Chin et al., 2015; Dieke et al., 2017). Hence, increased access to care is necessary for individuals with infertility to seek out medical treatment. Additionally, results from this study indicated that infertility length was related to severity of depression, hence individuals who have experienced infertility for a longer amount of time and perhaps do not have access to infertility treatment may be likely to experience depression. In addition to lack of access to
fertility treatment, previous studies have also indicated a lack of access to mental health care for Racially Diverse individuals (Dieke et al., 2017). According to the National Healthcare Quality and Disparities Reports (2019):

This unmet need [mental health care] is even greater for racial and ethnic minority populations. Nearly three-quarters (73%) of Asians and Pacific Islanders, 69% of African Americans, and 67% of Hispanics with a mental illness do not receive mental health treatment. (p. 28)

The potential reasons for lack of proper access to mental health treatment include: stigma and shame, lack of health insurance, beliefs about treatment, lack of familiarity with mental health treatment, and the representation among mental health care clinicians (NHQDR, 2019).

Results from this study indicated that there are group differences in shame, with Racially Diverse individuals with infertility experiencing more shame, thus supporting the need for education and training of mental health clinicians and medical personnel. Future interventions can specifically focus on providing support and treatment access to Racially Diverse individuals. Specifically, integrated care, which connects primary care and mental health care in the community, is a unique way to access Racially Diverse individuals and couples with infertility who may not otherwise have access to care. Further, providing medical and mental health care in the same setting increases opportunity for individuals to receive proper support (Holden et al., 2014). Also, interventions can be developed that increase access to care by including relationship education and mental health treatment. Community partnerships can promote relationships with underserved and minority communities by building trust and increasing the individual’s comfort level with pursuing fertility treatment and mental health treatment (Holden et al., 2014).
Gender and Resilience

Results of the current study indicate that resilience accounted for 18.23% of the variance in fertility related quality of life with gender as a covariate. Further, results indicate that higher levels of fertility related quality of life predict higher levels of resilience with a small effect size ($\beta = .427$, $p < .001$). Additionally, the covariate of gender significantly influenced resilience with a small effect size ($\beta = .309$, $p < .001$), meaning that men may experience more resilience in the context of infertility. Specifically, higher levels of fertility related quality of life predict higher levels of resilience in men, which is consistent with previous findings regarding gender and infertility (Vatanparast et al., 2020). Additionally, there was a significant and moderate relationship between fertility related quality of life and gender ($\rho = .415$, $p < .01$), indicating that men tend to experience more fertility related quality of life, which is consistent with previous findings that indicate that men experience more fertility related quality of life compared to women (male, $M = 55.15$; female, $M = 52.66$, $p < .05$; Zurlo et al., 2018). Further, Kim and colleagues (2018) found that there were significant group differences between men and women related to fertility related quality of life, where men experience more fertility related quality of life ($t = 7.24$, $p < .001$) and less infertility distress ($t = -3.61$, $p < .001$). Also, there was a significant yet weak relationship between gender and resilience ($\rho = .193$, $p < .01$), further supporting that men tend to experience greater resilience. Resilience is an individual’s ability to adapt and maintain protective factors in the face of adversity, extreme stress, or trauma (Bonanno, 2008; Luthar et al., 2000; Rutter, 2013). Further, resilience in the context of chronic health conditions, such as infertility, has been found to effectively mitigate infertility distress (Campbell-Sills & Stein, 2007; Li et al., 2019). Fostering resilience in individuals and couples can act as a protective factor mitigating the negative effects of infertility distress (Vatanparast et al., 2020).
Need for Biopsychosocial Approach

The Biopsychosocial Theory of infertility posits that infertility is more than just a physical experience, as infertility also impacts the individual’s emotions and relationships (Gerrity, 2001; Shreffler et al., 2017; Wamser-Nanney, 2019). Results from the current study indicate that the mind-body aspect of infertility accounted for 67.89% of the variance in fertility related quality of life, meaning that how the individual physically feels as well as perceives their physical state largely influences their overall quality of life. Also, results indicated that the emotional aspect of infertility accounted for 84.45% of the variance in fertility related quality of life, which is a very large amount. The emotional aspect of fertility related quality of life involves the individual’s feelings about their infertility and themselves. Lastly, results indicated that the social aspect of infertility accounted for 50.98% of the variance in fertility related quality of life, meaning that a large amount of fertility related quality of life is determined by how the individual perceives their relationships and friendships and whether they feel able to disclose their infertility with others. Further, the Biopsychosocial Theory of infertility suggests that the mediators of coping and social support affect the individual’s overall sense of well-being (Gerrity, 2001). Hence, addressing the individual’s need for social support, such as from a partner, can increase positive coping and decrease infertility-related stress (Gerrity, 2001).

Actor effects from the current study indicated that there was a significant actor effect with a moderate effect size ($\beta = .526; p < .05$) from the mind-body aspect of fertility related quality of life on resilience, meaning that the individual’s perception of the physical and mental connection can effect their level of resilience. Specifically, the more mind-body connection is a positive experience, the more resilience the individual may experience. This knowledge of the mind-body connection is pivotal for a holistic understanding of the client.
Biopsychosocial Approach in Integrated Care

Considering the biopsychosocial impact of infertility on individuals and couples, integrated care can provide a holistic approach to meet the couple’s needs in one setting. Counselors working in integrated care settings would be in the unique position to support couples with infertility, as many couples experience the medical procedures as anxiety-provoking and traumatizing for the individual (Shreffler et al., 2017). Further, considering many individuals feel shame when treated for infertility (Ceballo et al., 2015), counselors working in medical settings can provide support to medical personnel that are working with individuals and couples with infertility (Shreffler et al., 2017). Furthermore, the counselor can be available to offer behavioral treatment suggestions for the medical staff, as well as to provide emotional support for the couple as they move through the medical process (Boivin & Gameiro, 2015).

Previous research suggests that more counselors in integrated care settings, especially medical settings treating infertility, would be invaluable to the couple (Shreffler et al., 2017). Counselors working in integrated care who are aware of the impact of infertility, can support the couple, educate the couple of the impact of infertility on the relationship and advocate for the couple to the medical personnel to decrease feelings of shame.

Training Implications Related to Prevalence of Infertility

Results from this study indicate that there is indeed measurable impact of infertility on couple’s fertility related quality of life, relationships satisfaction, resilience, depression, and shame. Also, previous research has suggested that infertility is a unique trauma experience that deserves special attention when working with couples (Brigance et al., 2020). Hence, providing counselors with information and training on working with individuals and couples with infertility can prepare counselors for working with this population. Specifically, counselor training can
include: (a) assessing for infertility at the onset of treatment to inform treatment plan, (b) utilizing a biopsychosocial model to address infertility, (c) understanding how relationship quality can impact the individual and the couple, and (d) understanding how partners effect each other. Additionally, education on topics such as infertility can expand into training students on the mind-body connection to better understand how the prevalence of physical conditions can impact the emotional, mental, and social health of the individual.

The results from this study can be used to enhance the knowledge of infertility in couples counselors. Specifically, couples with infertility may experience less relationship satisfaction, and in turn less resilience, and more depression and shame. It is necessary that couples counselors screen and assess for the presence of infertility, as unacknowledged infertility may impede the treatment of the couple. For instance, counselors would greatly benefit from understanding the role of shame in couples with infertility, especially since the shame may inhibit clients from readily disclosing their infertility. Psychoeducation on the presence and impact of shame, how shame may make it more difficult to emotionally connect with their partner, and how shame increases depression would benefit couples. Counselors can also help couples emotionally connect beyond simple communication techniques, and rather through more emotionally vulnerable sharing. Once partners can understand the detrimental impact of shame, they can then take steps to support each other. Consequently, as couples emotionally process their shame related to infertility, the couple’s relational quality may improve. Also, it is pivotal that counselors understand the impact of infertility on depression as well as the relationship between length of infertility and depression, especially since the stressor of infertility cannot be changed. Instead, counselors can be prepared to help clients process their emotions, learn ways to cope with the symptoms of depression, and increase protective factors in the midst of the infertility. Next, it is necessary for counselors to
address the needs of both partners and help them understand how they impact each other. Specifically, counselors can help couples understand how they influence each other and teach the couple new strategies for communication and emotional connection. For instance, the couple can learn how to enhance their dyadic coping skills, work through the stressor together, and support each other through the process. Further, considering relationship satisfaction can be significantly influenced by fertility related quality of life, it is important for counselors to be aware that to enhance relationship quality in a couple, the infertility distress must be addressed. Further, relationship satisfaction can be a protective factor for couples with infertility, evidenced by how an increase in relationship satisfaction is related to a decrease in shame and depression, promoting positive and long-lasting effects on the couple’s ability to deal with the stressor of infertility. Additionally, couples counselors that are aware of the impact of infertility on the couple relationship can create treatment plans suited to their couples’ unique needs. For example, counselors can acknowledge the mind-body connection of infertility, the value of spirituality, how partners impact each other, and how race influences the experience of infertility. Addressing the relational aspects of infertility related quality of life with the couple could enhance the couple relationship, increase relationship satisfaction, and decrease shame in each partner.

Also, understanding how different races experience infertility differently is invaluable for being a multiculturally competent counselor. Treatment efficacy necessitates that the counselor fully understands the couple’s unique experience with infertility. Further, counselors working with diverse couples may encounter couples experiencing infertility who do not share their infertility in session due to feelings of shame. Counselors can first listen to the couple’s story to understand their experience, use strategies to promote relationship satisfaction, teach coping skills to reduce feelings of shame, and include the value of spirituality in session.
Infertility may seem like a niche topic that most counselors may not encounter. However, given the prevalence of infertility and the shame experienced as well as the number of couples that seek out counseling for unclear “couples problems,” (Reiter et al., 2017) it is possible that if the counselor does not ask questions related to infertility during assessment, the presence of infertility may go unaddressed and inadvertently affect the treatment. In sum, counselors with the understanding of how infertility impacts the individual and the couple can provide optimal individual and couples counseling services to clients with infertility.

**Recommendations for Future Research**

Based on the results of this study, future research can continue to help couples understand the impact of infertility on their relationship as well as help counselors understand best practice when working with individuals and couples with infertility. Specifically, future research can involve interventions designed to promote resilience and relationship satisfaction in couples with infertility to enhance protective factors and mitigate the effects depression and shame. Also, research that includes more diversity in the sample can provide a deeper understanding of racial differences when experiencing infertility to promote more culturally sensitive counseling practices. Suggested future topics of research are listed below:

1. Considering the racial differences found in the results related to relationship satisfaction, shame, and spirituality, future studies should purposefully include a more diverse sample to determine additional group differences and implications for culturally sensitive fertility related services.

2. Future interventions can be designed to specifically promote relationship education and increase access to care for Racially Diverse couples with infertility.
3. Future interventions can be designed to provide psychoeducation on the impact of infertility to medical professionals.

4. Future studies could test the impact of infertility on quality of life related to length of infertility, type of infertility, and cause of infertility.

5. Future studies could test relationship education interventions in the community to enhance relationship satisfaction in couples and mitigate the distress of infertility.

6. Future studies can investigate the effectiveness of integrated care when working with individuals and couples with infertility.

7. This study found that when including gender as a covariate, resilience was significantly predicted, hence, future studies should investigate the protective factors of resilience as well as how to promote resilience in couples with infertility.

8. In the current study, of the couples that participated, 9% were same-sex female couples. Future studies should investigate the prevalence and impact of infertility specifically in same sex couples.

9. Future studies should expand this research to include other sexual health concerns or chronic illness that couples may be experiencing.
Chapter Summary

In chapter five, the researcher provided a review of the current study and compared results to prior literature. The results of the study supported the theorized model for fertility related quality of life influencing relationship satisfaction, resilience, depression, and shame with gender as a covariate ($\chi^2/df = 2.86, p = .000; \text{CFI} = .916; \text{TLI} = .909; \text{RMSEA} = .058; \text{SRMR} = .075$). Fertility related quality of life explained a significant portion of the variance for depression (63.04%) and shame (22.27%). Overall, the findings of the investigation result in implications for couples with infertility, counselors and researchers. Thus, the conclusions of this study contribute to an emerging body of literature concerning individuals and couples with infertility and how their infertility effects their fertility related quality of life, resilience, depression, and shame.
EXEMPTION DETERMINATION

August 27, 2020

Dear Nikole Wilson:

On 8/27/2020, the IRB determined the following submission to be human subjects research that is exempt from regulation:

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<thead>
<tr>
<th>Type of Review:</th>
<th>Initial Study, Category 2</th>
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<tbody>
<tr>
<td>Title:</td>
<td>Couples with Infertility: The Dyadic Influence of Quality of Life, Relationship Satisfaction, Resilience, Depression, and Shame</td>
</tr>
<tr>
<td>Investigator:</td>
<td>Nikole Wilson</td>
</tr>
<tr>
<td>IRB ID:</td>
<td>STUDY00002097</td>
</tr>
<tr>
<td>Funding:</td>
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</tr>
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<td>Grant ID:</td>
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<td>• HRP-251-FORM - Faculty Advisor Scientific-Scholarly Review fillable form.pdf, Category: Faculty Research Approval;</td>
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<tr>
<td></td>
<td>• Connor–Davidson Resilience Scale, Category: Test Instruments;</td>
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<td></td>
<td>• Couple Satisfaction Index, Category: Test Instruments;</td>
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<td>• Depression Instrument, Category: Test Instruments;</td>
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<td></td>
<td>• Fertility Quality of Life Tool, Category: Test Instruments;</td>
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<td></td>
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This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please submit a modification request to the IRB. Guidance on submitting Modifications and Administrative Check-in are detailed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

[Signature]

Racine Jacques, Ph.D.
Designated Reviewer
APPENDIX B: EMAIL INVITATION
Hello,

My name is Niko Wilson, a Licensed Mental Health Counselor and a current doctoral candidate at the University of Central Florida in the Counselor Education program. I am currently working to complete my dissertation and am reaching out for your help in understanding the influence of infertility in your couple relationship.

To tell you a little bit about my study, I am examining the quality of life related to infertility in couples on relationship satisfaction, resilience, depression, and shame. My study includes a general demographic questionnaire and five instruments for a total of about 100 questions. The entire study should take about 15 minutes to complete. Also, considering there is a need for more medical research on infertility, I will be making a $1 donation for each individual participant to RESOLVE: The National Infertility Association.

To participate in my study, you need to be at least 18 years old, in a relationship with your partner for at least 1 year, have experienced self-identified infertility for at least 6 months, and both of you as a couple have to be willing to each take the survey individually. Your participation in this study is voluntary, and you may withdraw from the study at any time and without consequence. If you do choose to participate in the study, your responses will be anonymous and confidential. Please click the link below to go to the survey website (or copy and paste the survey link into your internet browser) to begin the survey.

Survey Link: [XXXX]

Your participation in this investigation is very important and will contribute to a growing body of research regarding the effects of infertility on multiple areas of life. I understand that this can be a sensitive topic to share, and I appreciate your time and consideration in completing the survey. It is only through the help of participants like you that researchers can provide information to help guide the development of research regarding the counseling profession.

I sincerely appreciate your assistance with this project. If you have any questions or concerns, or if you would like additional information about my study, please contact me anytime: (407) 676-4191 or Niko.Wilson@knights.ucf.edu Lastly, if you know of other couples who may be interested in participating, please forward my contact information. Thank you so much for your willingness to participate!

Sincerely,

Niko C. Wilson, MS, LMHC, NCC
Doctoral Candidate - Counselor Education
College of Community Innovation and Education
University of Central Florida
Phone: (407) 676-4191
Email: Niko.Wilson@knights.ucf.edu
APPENDIX C: INFORMED CONSENT
EXPLANATION OF RESEARCH

Title of Project: Couples with Infertility: The Dyadic Influence of Quality of Life, Relationship Satisfaction, Resilience, Depression, and Shame

Principal Investigator: Niko C. Wilson, M.S.

Faculty Supervisor: Sejal Barden, Ph.D.

You are being invited to take part in a research study. Whether you take part is up to you.

The purpose of this research study is to gain fundamental knowledge about the dyadic influence of infertility on couples. In order to successfully treat couples with infertility, it is necessary to understand how infertility affects the mental health, relationship quality, and quality of life of both partners, as well as how each partner’s experience of infertility influences the other. Understanding how infertility affects the couple relationship and how the couple relationship affects the individual coping with infertility is critical knowledge we aim to gain from the current investigation.

Participation will take place either online through a web-based Qualtrics survey or face-to-face through a paper survey packet. If participation occurs online, you will be emailed link to the electronic survey on Qualtrics, a secure, online, password protected site. The online survey will not contain any identifiable information, therefore, participation is anonymous. If participation occurs face-to-face, then the primary investigator will administer the survey packet via paper and pen. All physical completed survey packets will be stored in sealed, numbered envelopes with no identifiable information, therefore, anonymous. Whether participation is online or face-to-face, partners will take the assessments separate from each other to ensure confidentiality of responses. After your survey packets are completed and responses have been anonymously input in to the statistical software, the primary investigator will make a $1 donation per individual to RESOLVE: The National Infertility Association, is a non-profit, 501(c)(3) dedicated to providing access to infertility services, legislative advocacy, education, and community support to individuals with infertility.

Participation in this study will require only a one-time commitment to complete a survey packet that includes: (a) general demographic form, (b) Fertility Quality of Life Tool (FertiQol), (c) Couples Satisfaction Index (CSI), (d) Conner-Davidson Resilience Scale (CD-RISC), (e) PROMIS Depression Instrument, and (f) the Internalized Shame Scale (ISS). Participation in this study can take place either in Fall 2020 or Spring 2021 and the expected total time to complete the survey packet is 10-15 minutes. Participation in this study is anonymous and no identifiable information (e.g., first name, last name, date of birth etc.) will be collected.
Your participation in this study is voluntary. You are free to withdraw your consent and discontinue participation in this study at any time without prejudice or penalty. The data collected from the survey responses will remain anonymous and will be securely stored, by two levels of password protected and encryption on the primary investigator’s computer.

To participate in this research study:
- You must be 18 years of age or older,
- Have experienced self-identified infertility for a minimum of six months
- Both partners of the couple must be willing to participate

Study contact for questions about the study or to report a problem: If you have questions, concerns, or complaints please contact: Niko Wilson, Doctoral student, Counselor Education and Supervision program, College of Community Innovation and Education, by email at Niko.Wilson@knights.ucf.edu or (407) or Dr. Sejal Barden, Faculty Supervisor, Department Counselor Education and School Psychology at (407) 823-1748 or by email at Sejal.Barden@ucf.edu.

IRB contact about your rights in this study or to report a complaint: If you have questions about your rights as a research participant, or have concerns about the conduct of this study, please contact Institutional Review Board (IRB), University of Central Florida, Office of Research, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246 or by telephone at (407) 823-2901, or email irb@ucf.edu.

Sign: _____________________ Date: ________________________
APPENDIX D: GENERAL DEMOGRAPHIC FORM
General Demographic Questionnaire

Instructions:
Please provide your responses for each of the following questions. All responses are confidential.

1. What is your age in years? ______________________

2. Please indicate your gender:
   - [ ] Male
   - [ ] Transgender
   - [ ] Female
   - [ ] Other: ______________________

3. How do you describe your racial background (select all that apply)?
   - [ ] American Indian or Alaska Native
   - [ ] Asian
   - [ ] Black or African American
   - [ ] Bi-racial/Multiracial
   - [ ] Caucasian
   - [ ] Native Hawaiian or other Pacific Islander
   - [ ] Other (please state): ______________________

4. What is your ethnicity?
   - [ ] Hispanic or Latino
   - [ ] Non-Hispanic or Latino

5. Highest education completed:
   - [ ] No degree or diploma
   - [ ] High school diploma/ GED
   - [ ] Vocational/Technical Certification
   - [ ] Associate degree
   - [ ] Bachelors degree
   - [ ] Masters Degree/Advance Degree
   - [ ] Other: ______________________

6. Please indicate your estimated annual household income:
   - [ ] < $30,000
   - [ ] $31,000 - $60,000
   - [ ] > $75,000
   - [ ] $61,000 - $75,000
7. Please indicate if you live in a rural or urban area:

☐ Rural (low population areas)  ☐ Urban (area in or surrounding a city)

8. Please indicate your employment status:

☐ Part-time  ☐ Unemployed
☐ Full-time

9. Please indicate your geographic region:

☐ Northeast  ☐ South
☐ Midwest  ☐ West

10. What is your current relationship status?

☐ Committed relationship with cohabitation
☐ Committed relationship without cohabitation
☐ Married
☐ Divorced
☐ Separated

11. If you are divorced or separated, to what degree did the experience of infertility influence your relationship dissolution on a scale of 1 to 5 (1 being the lowest and 5 being the highest):

1          2        3         4         5

12. Please indicate the length of your relationship in years/months:

☐ Less than 1 year
☐ 1 - 3 years
☐ 4 - 6 years
☐ 7 - 10 years
☐ More than 10 years
13. Please indicate length of time experiencing infertility in years/months:
   - ☐ 6 months - 1 year
   - ☐ 1 - 3 years
   - ☐ 4 - 6 years
   - ☐ 7 - 10 years
   - ☐ More than 10 years

14. How long has it been since your initial experience with self-identified infertility?
   - ☐ 6 months - 1 year
   - ☐ 1 - 3 years
   - ☐ 4 - 6 years
   - ☐ 7 - 10 years
   - ☐ More than 10 years

15. Please indicate type of infertility:
   - ☐ Primary (Defined as trying to conceive first child)
   - ☐ Secondary (Defined as trying to conceive 2\textsuperscript{nd} or more children)
   - ☐ Other: __________________________

16. Please indicate cause of infertility:
   - ☐ Male factor
   - ☐ Female factor
   - ☐ Both
   - ☐ Unexplained
   - ☐ Unknown (have not sought medical help)

17. Please indicate if you have sought professional help for your relationship (mental health/marriage and family therapy, psychology):
   - ☐ Yes
   - ☐ No
     a. If yes, for how long did you attend sessions? ________________
18. Please indicate if you have sought professional help for infertility:

☐ Yes  ☐ No

   a. If yes, please identify what type of professional help: ________________
   b. If yes, please identify how long you have sought treatment: ____________

19. On a scale of 1 to 5 (1 being the lowest and 5 being the highest), how much importance do you place on faith or spirituality?

1          2        3         4         5

20. On a scale of 1 to 5 (1 being the lowest and 5 being the highest), how accessible has infertility treatment been for you?

1          2        3         4         5

21. On a scale of 1 to 5 (1 being the lowest and 5 being the highest), how stressful has the experience of infertility been for you?

1          2        3         4         5

22. Please select which of the following infertility organizations you would the researcher to donate your $1 to?

☐ Cade Foundation
☐ ASRM: American Society for Reproductive Medicine
☐ RESOLVE: National Infertility Association

Thank you! Please continue on to the next page.
APPENDIX E: FERTILITY QUALITY OF LIFE TOOL (FERTIQOL)
For each question, kindly check (tick the box) for the response that most closely reflects how you think and feel. Relate your answers to your current thoughts and feelings. Some questions may relate to your private life, but they are necessary to adequately measure all aspects of your life.

Please complete the items marked with an asterisk (*) only if you have a partner.

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<thead>
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<th>Question</th>
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<th>Poor</th>
<th>Neither Good nor Poor</th>
<th>Good</th>
<th>Very Good</th>
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<tbody>
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<td>For each question, check the response that is closest to your current</td>
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<td>thoughts and feelings</td>
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<tr>
<td>B Are you satisfied with your quality of life?</td>
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<td>For each question, check the response that is closest to your current</td>
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<td>thoughts and feelings</td>
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<tr>
<td>Q1 Are your attention and concentration impaired by thoughts of</td>
<td></td>
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<tr>
<td>infertility?</td>
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<tr>
<td>Q2 Do you think you cannot move ahead with other life goals and plans</td>
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<tr>
<td>because of fertility problems?</td>
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<tr>
<td>Q3 Do you feel drained or worn out because of fertility problems?</td>
<td></td>
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<tr>
<td>Q4 Do you feel able to cope with your fertility problems?</td>
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<tr>
<td>For each question, check the response that is closest to your current</td>
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<tr>
<td>thoughts and feelings</td>
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<tr>
<td>Q5 Are you satisfied with the support you receive from friends with</td>
<td></td>
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<tr>
<td>regard to your fertility problems?</td>
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<tr>
<td>Q6 Are you satisfied with your sexual relationship even though you have</td>
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<tr>
<td>fertility problems?</td>
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<td>For each question, check the response that is closest to your current</td>
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<tr>
<td>thoughts and feelings</td>
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<tr>
<td>Q7 Do your fertility problems cause feelings of jealousy and resentment?</td>
<td></td>
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<tr>
<td>Q8 Do you experience grief and/or feelings of loss about not being able</td>
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<tr>
<td>to have a child (or more children)?</td>
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<tr>
<td>Q9 Do you fluctuate between hope and despair because of fertility</td>
<td></td>
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<tr>
<td>problems?</td>
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<tr>
<td>Q10 Are you socially isolated because of fertility problems?</td>
<td></td>
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<tr>
<td>*Q11 Are you and your partner affectionate with each other even though</td>
<td></td>
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<tr>
<td>you have fertility problems?</td>
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<tr>
<td>For each question, check the response that is closest to your current</td>
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</tr>
<tr>
<td>thoughts and feelings</td>
<td></td>
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</tr>
<tr>
<td>Q12 Do your fertility problems interfere with your day-to-day work or</td>
<td></td>
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<tr>
<td>obligations?</td>
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</tr>
<tr>
<td>Q13 Do you feel uncomfortable attending social situations like holidays</td>
<td></td>
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<tr>
<td>and celebrations because of your fertility problems?</td>
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<tr>
<td>Q14 Do you feel your family can understand what you are going through?</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Response</td>
<td></td>
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<tr>
<td>Q15</td>
<td>Have fertility problems strengthened your commitment to your partner?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q16</td>
<td>Do you feel sad and depressed about your fertility problems?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q17</td>
<td>Do your fertility problems make you inferior to people with children?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q18</td>
<td>Are you bothered by fatigue because of fertility problems?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q19</td>
<td>Have fertility problems had a negative impact on your relationship with your partner?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Q20</td>
<td>Do you find it difficult to talk to your partner about your feelings related to infertility?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q21</td>
<td>Are you content with your relationship even though you have fertility problems?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q22</td>
<td>Do you feel social pressure on you to have (or have more) children?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q23</td>
<td>Do your fertility problems make you angry?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q24</td>
<td>Do you feel pain and physical discomfort because of your fertility problems?</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
APPENDIX F: COUPLE SATISFACTION INDEX (CSI)
THE COUPLES SATISFACTION INDEX (CSI)

<table>
<thead>
<tr>
<th>All the Time</th>
<th>Most of the Time</th>
<th>More often than Not</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
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</tbody>
</table>

2. In general, how often do you think that things between you and your partner are going well?

<table>
<thead>
<tr>
<th>Our relationship is strong</th>
<th>Not at all True</th>
<th>A little True</th>
<th>Somewhat True</th>
<th>Mostly True</th>
<th>Almost Completely True</th>
<th>Completely True</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>My relationship with my partner makes me happy</th>
<th>Not at all True</th>
<th>A little True</th>
<th>Somewhat True</th>
<th>Mostly True</th>
<th>Almost Completely True</th>
<th>Completely True</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I have a warm and comfortable relationship with my partner</th>
<th>Not at all True</th>
<th>A little True</th>
<th>Somewhat True</th>
<th>Mostly True</th>
<th>Almost Completely True</th>
<th>Completely True</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I really feel like part of a team with my partner</th>
<th>Not at all True</th>
<th>A little True</th>
<th>Somewhat True</th>
<th>Mostly True</th>
<th>Almost Completely True</th>
<th>Completely True</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
For each of the following items, select the answer that best describes how you feel about your relationship. Base your responses on your first impressions and immediate feelings about the item.

<table>
<thead>
<tr>
<th></th>
<th>INTERESTING</th>
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<th>4</th>
<th>3</th>
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<th>1</th>
<th>0</th>
<th>BORING</th>
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<table>
<thead>
<tr>
<th></th>
<th>BAD</th>
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<th>3</th>
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<th>5</th>
<th>GOOD</th>
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<th>FULL</th>
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<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>EMPTY</th>
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<table>
<thead>
<tr>
<th></th>
<th>STURDY</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>FRAGILE</th>
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</thead>
<tbody>
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<table>
<thead>
<tr>
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<th>DISCOURAGING</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>HOPEFUL</th>
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<tbody>
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</tr>
<tr>
<td>16</td>
<td>ENJOYABLE</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>MISERABLE</td>
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</table>

APPENDIX G: CONNOR–DAVIDSON RESILIENCY SCALE (CD-RISC)
Connor-Davidson Resilience Scale 10 (CD-RISC-10) ©

Please indicate how much you agree with the following statements as they apply to you over the last month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

1. I am able to adapt when changes occur.
2. I can deal with whatever comes my way.
3. I try to see the humorous side of things when I am faced with problems.
4. Having to cope with stress can make me stronger.
5. I tend to bounce back after illness, injury, or other hardships.
6. I believe I can achieve my goals, even if there are obstacles.
7. Under pressure, I stay focused and think clearly.
8. I am not easily discouraged by failure.
9. I think of myself as a strong person when dealing with life’s challenges and difficulties.
10. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.

Add up your score for each column

<table>
<thead>
<tr>
<th>not true at all</th>
<th>rarely true</th>
<th>sometimes true</th>
<th>often true</th>
<th>true nearly all the time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Add each of the column totals to obtain CD-RISC score

\[ \text{Score} = \text{sum of columns} \]

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APPENDIX H: PROMIS DEPRESSION INVENTORY
Emotional Distress – Depression – Short Form 8a

Please respond to each question or statement by marking one box per row.

In the past 7 days...

<table>
<thead>
<tr>
<th>Question</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Always</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>I felt worthless</td>
<td></td>
<td></td>
<td></td>
<td>□</td>
<td>□</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I felt helpless</td>
<td></td>
<td></td>
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<td>□</td>
<td>□</td>
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<td></td>
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<td>□</td>
<td>□</td>
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<tr>
<td>I felt depressed</td>
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<td>□</td>
<td>□</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>□</td>
<td>□</td>
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<tr>
<td>I felt hopeless</td>
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<td></td>
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<td>□</td>
<td>□</td>
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<td></td>
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<td></td>
<td></td>
<td>□</td>
<td>□</td>
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<tr>
<td>I felt like a failure</td>
<td></td>
<td></td>
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<td>□</td>
<td>□</td>
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<td></td>
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<td>□</td>
<td>□</td>
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<tr>
<td>I felt unhappy</td>
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<td></td>
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<td>□</td>
<td>□</td>
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<td></td>
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<td>□</td>
<td>□</td>
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<tr>
<td>I felt that I had nothing to look forward to</td>
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<td>□</td>
<td>□</td>
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<tr>
<td>I felt that nothing could cheer me up</td>
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</tbody>
</table>

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APPENDIX I: THE FORMS OF SELF-CRITICISING/ATTACKING & SELF-REASSURING SCALE (FSCRS)
THE FORMS OF SELF-CRITICISING/ATTACKING & SELF-REASSURING SCALE (FSCRS)

When things go wrong in our lives or don’t work out as we hoped, and we feel we could have done better, we sometimes have negative and self-critical thoughts and feelings. These may take the form of feeling worthless, useless or inferior etc. However, people can also try to be supportive of themselves. Below are a series of thoughts and feelings that people sometimes have. Read each statement carefully and circle the number that best describes how much each statement is true for you.

Please use the scale below.

Not at all like me  A little bit like me  Moderately like me  Quite a bit like me  Extremely like me
0 1 2 3 4

When things go wrong for me:

1. I am easily disappointed with myself.
   0 1 2 3 4
2. There is a part of me that puts me down.
   0 1 2 3 4
3. I am able to remind myself of positive things about myself.
   0 1 2 3 4
4. I find it difficult to control my anger and frustration at myself.
   0 1 2 3 4
5. I find it easy to forgive myself.
   0 1 2 3 4
6. There is a part of me that feels I am not good enough.
   0 1 2 3 4
7. I feel beaten down by my own self-critical thoughts.
   0 1 2 3 4
8. I still like being me.
   0 1 2 3 4
9. I have become so angry with myself that I want to hurt or injure myself.
   0 1 2 3 4
10. I have a sense of disgust with myself.
    0 1 2 3 4
11. I can still feel lovable and acceptable.
    0 1 2 3 4
12. I stop caring about myself.
    0 1 2 3 4
13. I find it easy to like myself.
    0 1 2 3 4
    0 1 2 3 4
15. I call myself names.
    0 1 2 3 4
16. I am gentle and supportive with myself.
    0 1 2 3 4
17. I can’t accept failures and setbacks without feeling inadequate.
    0 1 2 3 4
18. I think I deserve my self-criticism.
    0 1 2 3 4

© Gilbert et al., 2004
19. I am able to care and look after myself. 0 1 2 3 4
20. There is a part of me that wants to get rid of the bits I don't like. 0 1 2 3 4
21. I encourage myself for the future. 0 1 2 3 4
22. I do not like being me. 0 1 2 3 4
REFERENCES


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Moura-Ramos, M., Gameiro, S., Canavarro, M. C., Soares, I., & Almeida-Santos, T. (2016). Does infertility history affect the emotional adjustment of couples undergoing assisted


Rosario, P. M., & White, R. M. (2006). The internalized shame scale: Temporal stability,


