

The need to restore generative identity in women undergoing assisted reproductive technology: Development and psychometric validation of the fertility reparation inventory

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Abstract

Objective: This study described the development and psychometric evaluation of the fertility reparation inventory, providing measures of manic and expiatory reparation as symbolic dynamics of restoring one's procreative and generative identity through Assisted Reproductive Technology (ART).

Methods: Two cross-sectional studies were conducted on female patients undergoing ART ($N = 150$) and women from the general population ($N = 250$), respectively. Exploratory factor analysis and confirmatory factor analysis assessed construct validity and reliability. Pearson's bivariate correlations were used to provide convergent evidence of validity with omnipotence, perceived infertility-related stress, anxiety, depression, need for reparation, fear of punishment, and hope.

Results: The results confirmed a two-factor solution of the 12-item instrument, with adequate fit, a very good internal consistency, and well-supported forms of convergent validity.

Conclusion: This study provides a meaningful psychodynamic contribution, in both theoretical and empirical terms, for the understanding of emotional dynamics and psychological issues underlying the demand for ART.

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KEYWORDS

assessment, assisted reproductive technology, infertility, psychodynamics, reparation

1 | INTRODUCTION

The term ART (Assisted Reproductive Technology) has been introduced to indicate several medical treatments allowing a pregnancy when it does not occur spontaneously, including Intrauterine Insemination, In Vitro Fertilization, and Third Party-Assisted ART (with gamete donors). Since infertility rates affect 9% of couples worldwide, especially in industrialized countries (Stevenson & Hershberger, 2016), the use of ART has rapidly increased, overall approaching 0.1% of the total world population (Faddy et al., 2018).

Current clinical psychological research has highlighted the negative emotional implications of both infertility, in terms of shame, guilt, pain, and frustration (Vitale et al., 2017; Wiweko et al., 2017), and related treatment depicted as an overwhelming experience (Ezzell, 2016; Jaffe, 2017; Langher et al., 2019). Indeed, women undergoing ART often report profound distress and anxiety issue due to targeted sexual intercourse, injections, hormonal stimulations, egg and seminal fluid retrieval that dominate their daily routine (Purewal et al., 2018; Stanhiser & Steiner, 2018). Besides, it is well known that repeated attempts to achieve pregnancy constitute a source of distress in itself, also given the low success rates of ART, thus putting patients at risk of developing emotional problems and adjustment difficulties (Purewal et al., 2018; Wiweko et al., 2017).

1.1 | A brief overview of the existing measures about the subjective experience of infertility

Many studies in the field of infertility have employed measures to assess anxiety, depression, or coping strategies, along with infertility-related measures of distress, adjustment, and sexual, marital, or social concerns (Luk & Loke, 2015; Szkodziak et al., 2020).

The specific measures about the subjective experience of infertility developed in this research field can be grouped as follows (Río et al., 2008), depending on the areas explored:

- Emotional experience of infertility and ART treatment, as feelings of guilt, success, anger, frustration, confidence, anxiety, depression, powerlessness, and control:

Infertility Reaction Scale (Keye, 1984); Psychological Evaluation Test of Assisted Reproduction Techniques (Franco et al., 2002); The Effects of Infertility (Anderheim et al., 2005); Inventory of psychological problems in infertility (Llavona & Mora, 2006).

- Impact of infertility on different areas of life, in terms of stress and quality of life, including personal, social (e.g., family, friends and colleagues) and marital dimensions:

The Fertility Problem Stress (Andrews et al., 1991); The Infertility Specific Distress Scale (Stanton, 1991); Infertility Reaction Scale (Collins et al., 1992); The Fertility Problem Inventory (Newton et al., 1999); Infertility Distress Scale (Pook et al., 1999); Fertility Quality of Life Questionnaire (Boivin et al., 2011).

- Adaptation to the infertility condition, assessing psychological resources and coping strategies, such as problem-solving, avoidance, seeking social support, or positive reframing:

The Fertility Adjustment Scale (Glover et al., 1999); Questionnaire on the Desire for a Child (Hözlze & Wirtz, 2001); Psychological adjustment in infertility questionnaire (Llavona & Mora, 2002); Coping with Infertility Questionnaire (Benyamini et al., 2008); Questionnaire on Emotional Maladjustment and Adaptive Resources in Infertility (Río et al., 2008).

- Other specific aspects: Infertility Treatment Questionnaire (Shiloh et al., 1991); The Measure for Infertility Control (Miller-Campbell et al., 1991); Infertility Cognitions Questionnaire (Pook et al., 1999); Infertility Self-Efficacy Scale (Cunha et al., 2016).

As a result, various psychosocial perspectives were adopted to study individuals and couples experiencing infertility. These mainly include cognitive-behavioral, biopsychosocial, and stress and coping theories. These questionnaires focus largely on the psychological consequences, presumed to be negative, of an infertility diagnosis and ART treatments. Therefore, such questionnaires follow theoretical perspectives that focus on patients' negative conscious experience that, however, can be altered by social desirability biases (Diener, 2000). The most widespread measures in the infertility and ART field—such as quality of life, distress, anxiety—may not be able to grasp emotional and relational dynamics underlying the choice to resort to ART, the motivation to continue the treatment, or to seek other alternative opportunities. Within a psychodynamic perspective, it has been demonstrated instead that unconscious affective processes and emotional expectations, can affect patients' relationship with ART treatment and fertility staff (Langher et al., 2019). Nowadays, the scarce research exploring the therapeutic demand for ART by patients with infertility problems is derived, in fact, from indirect investigations, using fertility professionals and their experiences with patients as privileged information sources (Boivin et al., 2017; Fitzgerald et al., 2013; Leone et al., 2017; Hayward's, 2016). Therefore, standardized measures allowing a direct investigation of affective and motivational dimensions affecting the decision to resort to ART seem to be lacking.

1.2 | The desire for reparation in ART: An object relations perspective

Previous psychoanalytic literature proposed the reparative function of the woman procreative life, since the woman's urge to become pregnant and bear a child may symbolically represent the quality of receptiveness and vitality (Deutsch, 1945). From such a perspective, failing to procreate generates a deep narcissistic wound compromising one's generative identity (Langher et al., 2019). Indeed, infertility may arouse fears of "inner deadness, the failure of love to repair and sustain important connections with others, the inability of the self to maintain vital and nourishing relationships" (Mitchell & Black, 2016, p. 99). Therefore, a woman's failure to conceive may be intended as a traumatic event (Mann, 2014), involving the loss of a procreative function that requires a process of mourning of the desired generativity (Langher et al., 2019). Consistently, several psychoanalytic implications of ART have been highlighted in terms of unconscious reparative phantasies, such as the need to restore a damaged body and self-image, the effort to achieve status in the family and society, the desire to give a gift to the partner and the couple, or the attempt to repair one's childhood through generating a new life (Haynes & Miller, 2004; Mann, 2014).

The concept of reparation was early introduced by Klein (1929, 1957) and became central to her model of human psyche grounded on object relations, as unconscious phantasies relating to the self and objects that shape our inner reality and determine our experience and behavior (Klein, 1959; LaFarge, 2014). True reparation (also named authentic or proper reparation) is based on a depressive position involving the capacity to face the loss of a desired object (that, in our case, is the procreative function) and tolerate guilt-feelings for having damaged it in phantasy. This requires acknowledging and accepting both one's limits and the external reality as it is, as well as introjecting a stable good object through restorative phantasies and actions that symbolize love (Caputo et al., 2020a; Klein, 1957). However, when this capacity to mourn the loss and adapt to reality is lacking, some pseudo-reparations can be enacted through shifting to modes of functioning that are typical of a schizoid-paranoid position characterized by persecutory anxieties. On the one hand, the individual may resort to manic reparation as a

magical and immediate form of restoration, where depressive and guilt feelings are denied and persecutory anxieties are counteracted by manic maneuvers (i.e., control, triumph, contempt) to affirm the ego's omnipotence over the desired object, thus assuming a narcissistic vein (Klein, 1957). On the other hand, when such anxieties become overwhelming, persecutory guilt may progressively reduce the individual's autonomy by imposing demanding activities on the ego. This can be expressed through compulsive and obsessional restorative activities up to melancholic reparation, where the ego is identified with the lost object and self-destruction represents the only way to repair it (Klein, 1935, 1957, 1959). Anyway, manic and expiatory reparation should be conceived as potentially coexisting and interacting, thus referring to qualitatively different and independent constructs in line with previous research attempting to validate measures of reparation (Caputo et al., 2020a).

Based on this theoretical framework, the action of resorting to ART because of the difficulty of spontaneously conceiving a child can be considered as an attempt to remedy one's failed procreative and generative function, which can take the form of pseudo-reparations. Indeed, women who decide to undergo ART procedures, in all probability, show greater personal concerns due to their infertility problems, a strong desire for parenthood as a primary or essential goal of life, and an overall rejection of a childfree future. At the same time, they are less likely to resort to meaning-based coping strategies that involve thinking about infertility in a positive light, finding other life goals for personal growth, or looking for alternative solutions such as child adoption (Mann, 2014; Schmidt, 2006). As well, the miraculous possibilities to generate life beyond nature offered by ART may make women less prone to accept the infertility-related limitations and renounce the dream of biological motherhood (Castellano et al., 2011; Fedele et al., 2020). However, even when faced with the success of ART treatment, the representation of one's generativity can remain compromised because ART does not succeed to definitively heal the narcissistic wound of infertility, further confirming not having been able to conceive a child alone (Agostini et al., 2009).

1.3 | Manic reparation

As mentioned above, manic reparation should be distinguished from true reparation since it involves taking refuge in a good internal object (Schmideberg, 1930) or in a good external object (Searl, 1929) to face loss, thus escaping consequent guilt and depressive feelings (Segal, 1981). Therefore, it is narcissistic and characterized by the control of the desired object (Figlio, 2012), grounded on an underlying phantasy of omnipotence [where] no one was really hurt, and if they were I can repair anyone or anything (Hinshelwood, 1989, pp. 340–342). The denial of the loss acts as a way to alleviate emotional distress, by preserving the ego's integrity and the hope to remedy in achieving the desired object (Caputo et al., 2020a). However, the lack of authentic concern and painful feelings may fuel unrealistic confidence and grandiose delusions that result to be ineffective in the long run (Caputo et al., 2020b).

Concerning the subjective experience of infertility, women resorting to ART are not always aware of their age-related decline in fertility, the low success rates of ART, and all the efforts and fatigues required by the treatment (Hayward, 2016; Langher et al., 2019). In fact, several therapeutic attempts are often necessary to achieve a pregnancy and, despite all the efforts, giving birth to a child is an almost rare event. Therefore, they often tend to show excessive and unrealistic expectations to receive quick and effective solutions from their specialists (Fitzgerald et al., 2013; Leone et al., 2017), who are perceived as omnipotent restorers of their biological integrity on a symbolic level (Castellano et al., 2011; Langher et al., 2019). However, when treatment does not provide the expected outcomes, patients may experience failure as unbearable with consequent feelings of anger (Fassino et al., 2002) and become manipulative, entitled, noncompliant, and openly hostile, demanding an increasing amount of time and attention from medical staff (Boivin et al., 2017; Grill, 2015). Patients' manic reparation can thus trigger ambivalent emotions of idealization and devaluation (Castellano et al., 2011), where passive-aggressive dynamics are projected out into the therapeutic relationship (Fedele et al., 2020) and possible conflicting situations emerge (Norré & Wischmann, 2011). In this regard, previous research has highlighted the presence of such ambivalent feelings also in the fertility staff as countertransference responses to the process of idealization and devaluation enacted by patients (Castellano et al., 2011;

Fedele et al., 2020). On the one hand, there is a sense of grandiosity in pursuing the ambitious mission of realizing the couple's procreative dream beyond the limits of nature and rehabilitating patients' image, according to a restorative sense of justice (Castellano et al., 2011; Fedele et al., 2020). Indeed, also care professionals may resort to manic reparation to confirm that they have sufficient abilities to repair damage in others, as to defend themselves against their fear to failure (Caputo et al., 2020b; Caputo, 2020; Roberts, 1994). However, on the other hand, since curing infertility is often not possible (Pfeffer, 1993), professionals may experience feelings of frustration, powerlessness, and uselessness, with negative implications in terms of heightened care burden and professional identity (Fedele et al., 2020).

1.4 | Expiatory reparation

Alternative pseudo-reparations include forms of obsessional and melancholic reparation, which are characterized by repetition compulsion in facing overwhelming guilt feelings. Compulsive undoing is meant as an omnipotent way to placate persecutory anxiety through magical repetition of actions without effectively mourning depressive states (Hinshelwood, 1989; Klein, 1935, 1959). Indeed, compulsive repetition and self-annihilation allow preserving control and relative potency, which prevent from accepting the limitations due to reality and considering the possibility to definitively renounce to the desired object. Since reparation is in phantasy impossible, this results in an endless process where there is no hope for effective restoration and the individual may definitively attack the ego in its identification with the lost object (Klein, 1935). Crocetti and Pallaoro (2007) has defined these forms of reparation as "expiatory", since super egoic instances overlap with egoic ones, leading to processes of constant self-denial and self-emptying. Such processes can manifest themselves in self-denigration or all those conditions placing the individual in submission or the role of victim. Unlike manic reparation, which keeps guilt and depressive feelings at bay, expiatory reparation is triggered by an excess of guilt and involves a state of constant anxiety and chronic depression the individual is not able to overcome, as the product of self-hatred for having irremediably damaged the loved object (Klein, 1957, 1959).

The concept of repetition compulsion has been used by Mann (2014) to provide a psychoanalytic understanding of the repeated ART trials and failures in patients who resort to these medical procedures, as a sort of unconscious self-induced traumatization. Indeed, each new ART cycle follows the unprocessed mourning of a loss with persistence to repeat (Mann, 2014). This appears in line with previous qualitative research on women undergoing ART, showing the tendency to bear all the efforts and sufferings it takes to achieve their motherhood dream (Fedele et al., 2020). A diagnosis of infertility often triggers a strong sense of personal deficiency due to failing "essentially to do what you're put on earth to do" (Schofield, 2015, pp. 101–102), involving negative emotions such as shame, guilt, and self-deprecation (Yao et al., 2018). This is intertwined with the perceived pressure to procreate because of the cultural and social stereotypes of nonmotherhood that mostly stigmatize childless women as desperate, unfulfilled, selfish, and unfeminine (Gillespie, 2001; Holmes, 2014). Anyway, the strong investment in ART procedures for pursuing social inclusion and placating the great wound of infertility leads such women to perceive treatment as an additional source of depression, anxiety, stress, and despair (Purewal et al., 2018; Stanhiser & Steiner, 2018) that, with the progression of therapeutic failures, may generate a real "failure syndrome" (Langher et al., 2019; Milazzo et al., 2016). Besides, their high sense of sacrifice and irremovable assertiveness to get pregnant makes them prone to accept any consequence of ART, without concerns about the experience of a fragmented and invaded body, the potential side-effects of ART procedures on their health, and the overall negative repercussions on couple satisfaction and marital relationship (Castellano et al., 2014; Fedele et al., 2020; Mann, 2014). Interestingly, previous studies have highlighted that the nature of ART treatment, as a step-by-step path with fragmented work procedures and uncertain outcomes, may induce anxiety feelings also in fertility specialists predisposing them to obsessional and compulsive forms of reparation (Boivin et al., 2012; Fedele et al., 2020). Indeed, in line with the organizational and social mandate of fertility services, the staff may perceive a strong sense of job responsibility and duty as well as incumbent feelings of pressure to comply with patients' expectations (Fedele et al., 2020). This is expressed through a laborious attempt to remedy that may fuel a state of constant alertness that care professionals try to compulsively placate through repetitive and structured routines.

However, the highly technical nature of the ART professionals' work may engender the risk of depersonalizing patients looked at as childbearing machines, thus leading to potential burnout and reduced work meaningfulness over time (Fedele et al., 2020; Gupta & Richters, 2008).

2 | AIMS OF THE STUDY

To enable the evaluation of the forms of pseudo-reparation presented above, the present study developed and validated the Fertility Reparation Inventory (FRI), providing two scores respectively measuring manic reparation and expiatory reparation. Indeed, despite several theoretical contributions having highlighted the relevance of the desire for reparation about undergoing ART from an object relations perspective, such dimensions have never been empirically tested probably because of the measurement-related problems in the psychoanalytic tradition (Silver & Spilerman, 1990).

The present study may contribute to overcoming the limited advancement of object relations theory in the research context of infertility issues, by providing an empirical basis for the psychodynamic construct of reparation in line with previous studies (Caputo et al., 2020b). This may allow researchers to consider the role of symbolic and unconscious dimensions intertwined with the subjective experience of infertility and the mourning process of the loss of one's generative function. As well, it can provide fertility professionals with new insights into the expectations of women undergoing ART, which can be particularly fruitful from a clinical perspective. First, from the phantasmatic function of ART, it may allow the examination of defensive patterns that may be maladaptive in coping with the treatment path, thus resulting in patients' psychological distress or reduced emotional wellbeing over time. Second, it may enlighten possible transference/countertransference processes running through the therapeutic relationship, which interfere with treatment adherence and continuation and engender conflicting dynamics with the fertility staff.

Two studies were conducted in the Italian context based on different samples—female patients undergoing ART (Study 1) and women from the general population falling in the same age range (Study 2)—which overall consented to evaluate the FRI internal structure through both explorative (Study 1) and confirmatory (Study 2) factor analyses. Besides, both studies provided measures of FRI reliability and evidence concerning convergent forms of validity.

Concerning this, the Study 1 was specifically used to test the following hypotheses:

H1. Manic and expiatory reparation correlate with omnipotence since they are pseudo-reparations that are defensive. Indeed, they both express magical forms of restoration and a tendency to act as having unlimited potential beyond the limitations of the external world, though in different ways. Specifically, manic reparation is grounded on illusions of power and lack of reality testing, whereas expiatory reparation expresses a compulsive form of control that is enacted through self-sacrifice.

H2. Expiatory reparation correlates with perceived infertility-related stress that, instead, is not associated with manic reparation. Indeed, whereas in expiatory reparation there is a constant sense of inadequacy and psychological suffering due to the irremediable infertility-related loss, no distress emerges in manic reparation since it is grounded on the denial of loss and consequent concern for one's condition.

H3. Expiatory reparation correlates with anxiety and depression that, instead, are not associated with manic reparation. Indeed, expiatory reparation involves both anxiety feelings (e.g., anguish, uncertainty, fear of failure) and a prolonged, chronic and unsolved depressive state where loss is not adequately mourned. Instead, manic reparation is aimed at denying painful feelings by lessening guilt-related anxiety and triumphing over depressive-like states.

Besides, the Study 2 was used to test the following hypotheses:

H4. Both manic and expiatory reparation are associated with the need for reparation but only expiatory reparation correlates with the fear of punishment. Indeed, both manic and expiatory reparation reveal the investment in the desired object and the propensity to remedy one's condition through magical thinking. Anyway, only expiatory reparation is accompanied by excessive guilt and persecution feelings tied to the anticipation and fear of impending punishment.

H5. Manic reparation is positively associated with hope, whereas expiatory reparation negatively correlates with it. Indeed, manic reparation is intended to preserve hope for the future although through unrealistic and

idealized expectations. Instead, expiatory reparation is grounded on despair and reduced trust in effective restorative processes, with self-sacrifice representing the only way to repair.

3 | STUDY 1

3.1 | Method

3.1.1 | Development of the FRI

The test instructions asked to imagine a situation where a woman had decided to resort to an ART center and invited the respondents to focus on their feelings. The semi-projective nature of the instructions aimed at evoking a phantasmatic rather than a real situation as to grasp imaginative capacity, consistent with a psychodynamic lens. Besides, this statement made the test completion suitable for all women, independently from their fertility condition and potential resorting to ART. To facilitate the respondents' identification with the female protagonist of the described situation, they were encouraged to complete the questionnaire freely and without thinking excessively, stating there were no right or wrong answers. An initial pool of 12 items was developed to assess the two constructs of manic and expiatory reparation (6 items each). Enough item variability was ensured in terms of content domains including the perception of the infertility condition, the motivation to resort to ART, and the expectations about the treatment outcome. Three major aspects were considered in the stimuli creation: (a) prevalent feelings; (b) personal attributes to remedy; and (c) expected outcome of reparation.

Specifically, manic reparation was characterized by items that suggest feeling overconfident and unconcerned, will power and personal resoluteness to remedy, and certainty about successful outcomes, respectively. Whereas, expiatory reparation was characterized by anxiety and despair feelings, a sense of sacrifice and compulsion to remedy, and fear of failure. Items scored on a 5-point Likert-type scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree*, 5 = *strongly agree*) indicating to what extent respondents agreed with each statement.

3.1.2 | Content validity

After the initial process of item development was completed, a team of three psychologists with a clinical and psychodynamic background assessed the extent to which the instrument covered the different aspects of the constructs that it was supposed to measure. The experts were asked to rate the appropriateness of each item based on the above-mentioned three criteria about the operational definition of manic reparation and expiatory reparation. Each item was given four different ratings, respectively, focusing on relevance, clarity, simplicity, and ambiguity through a 4-point scale (from 1 = *not relevant/clear/simple or doubtful* to 4 = *very relevant/clear/simple or meaning is clear*). Item Content Validity Index was computed as the percentage of experts that approved the item and gave it a score of 3 or 4. For each sentence, only the items rated 3 or 4 by all the experts (thus scoring over 0.75) for each criterion were retained (Martuza, 1977), while the remaining items were restated and newly rated through an iterative process. Therefore, the final version of FRI included 6 items per dimension (manic and expiatory reparation), overall resulting in a 12-item instrument.

3.1.3 | Face validity

The FRI was pretested through participation by 10 adult female patients who had undergone ART procedures at an ART center to test the face validity and comprehensibility of the instrument. The patients evaluated the FRI items in

terms of readability, comprehensibility, sentence length, and clarity of meaning to ready the instrument for implementation. Face validity was assessed through a 4-point Likert scale (from 1 = *very unreadable, incomprehensible, inappropriate in sentence length, unclear in meaning* to 4 = *very readable, comprehensible, appropriate in sentence length, clear in meaning*), with a minimum score of 3 (by all the participants) considered as appropriate. After pretesting, no change to the formulated items of the FRI was required.

3.1.4 | Participants and procedure

A convenience sample of 150 women undergoing ART entered the study voluntarily. The patients were recruited at an ART Italian center of a public hospital in Rome and were consecutively enrolled. Inclusion criteria were: age between 18 and 43 years (with 43 being the age limit—required by law—for women resorting to public ART centers), first access to an ART center, good Italian language proficiency to fully comprehend or perform the psychological administration, and lack of cognitive or psychiatric disorders. Overall, 88.7% were Italian and had a mean age of 36.56 years ($SD = 4.04$), with an education level of primary school (1.3%), lower secondary school (5.3%), upper secondary school (34.7%), and university (58.7%). Regarding their work status, 84.7% were employed, 15.3% were unemployed. Regarding marital status, 60% of them were married and 40% were cohabitant. Infertility causes were feminine in 28% of cases, masculine in 30%, and idiopathic in 42%. Overall, only 14.7% already had children and, on average, they had been trying to get a spontaneous pregnancy for 2.37 years ($SD = 1.83$).

They were asked to participate in the study during the initial welcome and reception at the ART center after having booked their first medical visit. The administration was conducted by a clinical psychologist in a reserved and confidential place after the informed consent was obtained. The study received the research ethics committee approval by BLINDED FOR REVIEW (Prot. no. 0000589 of 09/05/2019) and followed the Declaration of Helsinki and its later amendments, ensuring patient privacy and anonymizing respective data.

3.1.5 | Measures

Omnipotence

The 3-item scale of the omnipotence of the Italian version of the Response Evaluation Measure-71 (Prunas et al., 2009) was used. The items—rated on a 9-point scale from “strongly disagree” (scored as 1) to “strongly agree” (scored as 9)—assess the defensive tendency to establish dominance and control over the environment by feeling or acting as having unlimited power and potential. In the present study, Cronbach's alpha was .69.

Perceived infertility-related stress

The Italian version of the Fertility Problem Inventory—Short form (Zurlo et al., 2017) was used, which consists of 27 items evaluating the social concern, need for parenthood, rejection of childfree lifestyle, and couple's relationship concern on a 6-point Likert scale ranging from “strongly disagree” (scored as 1) to “strongly agree” (scored as 6). The sum of the items provides an overall measure of global stress associated with the condition of infertility in personal, social, and relational terms. In the present study, Cronbach's alpha was .83.

Anxiety and depression

The Italian version of the Hospital Anxiety and Depression Scale (Costantini et al., 1999) was used as a screening instrument for anxiety and depression in a nonpsychiatric setting. It is composed of two 7-item scales as separate measures of emotional disturbance referring to symptoms of anxiety and depression respectively, through a 4-point Likert scale ranging from 0 (“not at all”) to 3 (“most of the time”). In the present study, Cronbach's alpha was .75 for anxiety and .69 for depression.

3.1.6 | Statistical analyses

Distributional properties of the FRI were inspected to examine the normality of the total scores. An exploratory factor analysis (EFA)—using maximum likelihood extraction method and direct oblimin rotation—was then performed to establish and confirm the factor structure of the instrument. The sample size was considered acceptable because a person-to-item ratio of 10:1 as a common rule of thumb was ensured. Each item was included in a specific factor if there was a minimal factor loading of .4, while to determine the number of factors to be retained, the Kaiser criterion and parallel analysis were used (Fabrigar et al., 1999). To assess the reliability of the test scores, the internal consistency of the FRI-related factors was measured by Cronbach's alpha. Pearson's bivariate correlations were then performed to assess the convergent forms of validity of FRI with omnipotence (Hypothesis 1), global stress associated with infertility problems (Hypothesis 2), as well as measures of anxiety and depression (Hypothesis 3). The analyses were conducted through SPSS 24.0.

3.2 | Results

No missing data were present. Based on the results of descriptive statistics (Table 1), it could be concluded that normality assumptions were tenable because values for skewness and kurtosis between -1 and $+1$ prove normal univariate distribution (Peat & Barton, 2008).

An EFA was used to test the dimensionality of the instrument. Two factors with an eigenvalue greater than 1.0 were extracted accounting for 64.18% of the variance of the original items. Parallel analysis confirmed that two factors should be retained because their eigenvalues from our actual data set exceeded the 95th percentile of eigenvalues derived from random data sets. Eigenvalues were, respectively, equal to 4.18 (1.49, confidence interval [CI]: 1.37, 1.61) and 3.52 (1.36, CI: 1.26, 1.46). The results of this EFA were then rotated. The KMO of .84 verified the sampling adequacy for the EFA and Bartlett's test of sphericity confirmed the suitability of data for factor analysis, $\chi^2(66) = 949.40$, $p < .001$. Anti-image correlation values for individual items were all >0.75 , which is above the acceptable limit of 0.50 (Field, 2013). As shown in Table 2, overall factor loadings were satisfactory and communalities ranged from 0.38 to 0.72.

With regard to the reliability of the FRI scores, Cronbach's alpha coefficients were 0.90 (manic reparation) and 0.86 (expiatory reparation). Correlation analyses between the FRI scores and further measures of convergent validity confirmed all our study hypotheses (see Table 3). Both manic and expiatory reparation were positively associated—to a small but statistically significant extent—with omnipotence, thus revealing their defensive nature as pseudo-reparations (Hypothesis 1). As well, only expiatory reparation was positively associated with perceived infertility-related stress (Hypothesis 2), as well as with anxiety and depression measures with medium to high effect sizes (Hypothesis 3).

4 | STUDY 2

4.1 | Method

4.1.1 | Participants and procedure

A Web-based survey was promoted by a snowball sampling procedure, according to the online survey design, development, and implementation guidelines suggested by Andrews et al. (2003). Inclusion criteria specified in the survey presentation were: female gender, age between 18 and 43 years, good Italian language proficiency to fully comprehend or perform the psychological administration, lack of cognitive or psychiatric disorders, and no previous

TABLE 1 Item distribution statistics

Item	M	SE	SD	Skewness	Kurtosis
I have decided to resort to the center as I'm self-confident, if I will have will power I will succeed to get what I wish	3.71	0.08	0.94	-0.72	0.27
I have asked for an appointment as I'm resolute, if I will want to see it through, there will be nothing unsolvable	3.59	0.08	0.93	-0.43	-0.28
I have asked for an appointment as I'm really anxious, I necessarily have to make a try even if I fear the situation will not be solved	2.48	0.09	1.08	0.31	-0.74
I feel at ease about the path, if I wish it, there is nothing I can't get	3.35	0.08	0.99	-0.17	-0.68
I feel confident about taking the treatment, I have a great will power and I know it will be fine	3.58	0.07	0.89	-0.22	-0.14
I feel downcast about taking the treatment, I'm ready to pay any price even if it does not go well	2.21	0.07	0.88	0.43	-0.41
I feel very nervous about the path, but I have to face it even if the idea of failing scares me	3.35	0.09	1.07	-0.50	-0.58
I feel strong about my situation, if I will resolute I will get what I wish	3.43	0.08	0.95	-0.14	-0.35
I feel desperate about my condition, I'm ready to pay any price even if I fear I will be disappointed at the end	1.92	0.07	0.86	0.81	0.52
I feel confident about my condition, if I will have will power there will be nothing unsolvable	3.34	0.08	0.93	-0.03	-0.74
I feel anxious about my condition, I know I have to face it even if I fear about not finding a solution	2.56	0.09	1.06	0.24	-1.00
I feel profoundly sad about my situation, I'm willing to make any sacrifice even if I'm not optimistic	2.31	0.08	0.98	0.53	-0.31

TABLE 2 Loading for exploratory factor analysis of the FRI items (Study 1, N = 150)

Item	Factor		
	1	2	CM
I have decided to resort to the center as I'm self-confident, if I will have will power I will succeed to get what I wish	0.69	0.07	0.47
I have asked for an appointment as I'm resolute, if I will want to see it through, there will be nothing unsolvable	0.72	0.06	0.52
I have asked for an appointment as I'm really anxious, I necessarily have to make a try even if I fear the situation will not be solved	0.03	0.77	0.59
I feel at ease about the path, if I wish it, there is nothing I can't get	0.81	-0.10	0.67
I feel confident about taking the treatment, I have a great will power and I know it will be fine	0.81	-0.07	0.66
I feel downcast about taking the treatment, I'm ready to pay any price even if it does not go well	0.21	0.62	0.41
I feel very nervous about the path, but I have to face it even if the idea of failing scares me	-0.10	0.61	0.38
I feel strong about my situation, if I will resolute I will get what I wish	0.78	0.05	0.60
I feel desperate about my condition, I'm ready to pay any price even if I fear that at the end I will be disappointed	0.03	0.76	0.58
I feel confident about my condition, if I will have will power there will be nothing unsolvable	0.84	-0.07	0.71
I feel anxious about my condition, I know I have to face it even if I fear about not finding a solution	-0.16	0.83	0.72
I feel profoundly sad about my situation, I'm willing to make any sacrifice even if I'm not optimistic	-0.04	0.73	0.54
Eigenvalue	4.18	3.52	
Variance explained	34.85	29.33	
Inter-factor correlation			
Factor	1	2	
1	-		
2	-1.04	-	

Note: Extraction Method: Maximum Likelihood. Rotation Method: Oblimin with Kaiser Normalization. Factor loadings ≥ 0.40 are in bold. Items were translated into English only for the purpose of the present study. Factor: in factor analysis, multiple observed variables have similar patterns of responses because they are all associated with a latent (i.e., not directly measured, or factor) variable. Eigenvalue: is a measure of how much of the variance of the observed variables a factor explains. Any factor with an eigenvalue ≥ 1 explains more variance than a single observed variable.

Abbreviations: ER, expiatory reparation; FRI, fertility reparation inventory; MR, manic reparation.

TABLE 3 Correlations between FRI scores and measures of convergent validity (two-tailed Pearson's *r*, 95% CI) (Study 1, N = 150)

	Omnipotence	Infertility global stress	Anxiety	Depression
Manic reparation	0.21* (0.05, 0.36)	0.05 (-0.11, 0.21)	-0.10 (-0.26, 0.06)	-0.15 (-0.30, 0.01)
Expiatory reparation	0.16* (0.00, 0.32)	0.55*** (0.43, 0.66)	0.42*** (0.28, 0.54)	0.43*** (0.29, 0.55)

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

Abbreviations: CI, confidence interval; FRI, fertility reparation inventory.

diagnosis of infertility or presence of ART treatment. The survey was proposed as part of a research project exploring women's perception of infertility issues and provided a brief definition of ART before the completion of psychological measures. Overall, a convenience sample of 250 women completed the survey. They were Italian in 99.2% of cases and had a mean age of 28.68 years ($SD = 4.34$), with an education level of upper secondary school (24.4%) and university (75.6%). Regarding their work status, 57.2% were employed, 12% were unemployed, and 30.8% were university students. Regarding marital status, 10.4% of them were married, 18.8% were cohabitant, 33.2% in a romantic relationship, and 37.6% single. Besides, only 9.2% already had children. Participants gave their informed consent and completed the survey anonymously. The study received the research ethics committee approval by BLINDED FOR REVIEW (Prot. no. 0000589 of 09/05/2019).

4.1.2 | Measures

Need for reparation and fear of punishment

The instrument developed by Caprara et al. (1990) was used, which included two validated scales about the need for reparation and fear of punishment, exploring common dimensions of guilt and aggression according to the Kleinian framework. The Need for Reparation scale (consisting of 15 effective items and additional 5 control items) measured a proneness to experience a desire for justice and need for reparation in facing possible guilt-eliciting situations. Whereas, the Fear of Punishment scale (consisting of 23 effective items and additional 7 control items) measured the proneness to experience guilt-related feelings of persecution and oppression that were tied to the fear of impending punishment. All items were rated on a 6-point scale ranging from 0 ("completely false for me") to 5 ("completely true for me"). In the present study, Cronbach's alpha was .75 for the need for reparation and .92 for the fear of punishment.

Hope

The Italian version of the Herth Hope Index (Ripamonti et al., 1994) was used to explore the sense of trust and hope toward the future. It consists of 12 items rated on a 4-point Likert scale and provides a unidimensional measure whose score ranges from 12 to 48, with a higher score corresponding to higher levels of hope. In the present study, Cronbach's alpha was .80.

4.1.3 | Statistical analyses

Confirmatory factor analysis (CFA) was applied to this sample to confirm the factor structure of the 12-item FRI found in the study 1, testing a two-factor model where each construct was specified as a latent variable indicated by its respective items. The maximum likelihood method was used and the latent factors were allowed to correlate. The sample size was ensured based on a person-to-item ratio of 10:1. The following components of fit were evaluated (Hu & Bentler, 1995): the χ^2/df , the root mean square error of approximation (RMSEA), the standardized root mean square residual (SRMR), the confirmatory fit index (CFI), and the Tucker-Lewis Index (TLI). The values of χ^2 ratio less than 3 (or in some instances 5) are often taken to indicate acceptable models (Kline, 2010). As suggested by Hu and Bentler (1999), RMSEA values up to 0.05 indicate good fit, between 0.06 and 0.08 indicate adequate fit, and >0.10 indicate a poor fit. Whereas SRMR values below 0.08 are indicative of a good fit; as well, CFI and TLI values greater than 0.90 are substantially acceptable, whereas values greater than 0.95 indicate a good model fit (Byrne, 2010). To assess the reliability of the test scores, internal consistency of the different dimensions of the FRI was measured by Cronbach's alpha. Pearson's bivariate correlations were then performed to assess the convergent forms of validity of FRI with the need for reparation and fear of punishment (Hypothesis 4), as well as

with hope (Hypothesis 5). The analyses were conducted through SPSS 24.0 and applying the STATA statistical package (Version 12) for CFA.

4.2 | Results

The results of CFA indicated an adequate fit of the two-factor model of the FRI, $\chi^2(53) = 125.871$, $\chi^2/df = 2.37$, CFI = 0.948, TLI = 0.936; RMSEA = 0.074 (90% CI: 0.058, 0.091), SRMR = 0.050. All the factor loading estimates were statistically significant ($p < .001$) and Manic reparation and Expiatory reparation items loaded solely on the relative factors (lowest loading value: 0.57, highest loading value: 0.85). With regard to inter-factor correlations, consistently with our theoretical framework, the two factors were independent and uncorrelated ($r = .01$, $p = .877$).

With regard to the reliability of the FRI scores, Cronbach's alpha coefficients were 0.90 (Manic reparation) and 0.85 (Expiatory reparation). Correlation analyses between the FRI scores and further measures of convergent validity confirmed all our study hypotheses (see Table 4). Consistent with our theoretical framework, both manic and expiatory reparation correlated positively—to a small but statistically significant extent—with the need for reparation; whereas only expiatory reparation was associated with the fear of punishment (Hypothesis 4). Then, inverse associations were confirmed with hope, which correlated positively with manic reparation and negatively with expiatory reparation (Hypothesis 5).

5 | GENERAL DISCUSSION

The present manuscript is grounded on a psychodynamic conceptualization of reparation in the field of ART according to Klein's object relations theory, with the aim of developing and validating the FRI. FRI was intended to assess two main constructs, i.e., manic reparation and expiatory reparation, as different modes of restoring one's procreative and generative function that is damaged by the infertility condition on a symbolic level. Both manic and expiatory reparation are meant as pseudo-reparations since they reveal the difficulty in mourning the infertility-related loss through resorting to ART, as able to placate one's deep narcissistic wound and restore one's generative identity. In detail, manic reparation refers to a magical and immediate form of restoration, where depressive and guilt feelings are denied and persecutory anxieties are counteracted to affirm the ego's omnipotence. Whereas, expiatory reparation refers to a self-sacrificing and compulsive form of restoration, aimed at controlling persecutory guilt and resulting in constant anxiety and chronic depression due to self-hatred for the symbolic damage.

The FRI has a semi-projective nature that allows grasping imaginative capacity and thus being suitable for all women, independently from their fertility condition and potential resorting to ART. After completing the process of content and face validity, the final version of the FRI resulted in a 12-item instrument (6 items for each dimension). Two studies were then conducted to test the construct validity by exploratory (Study 1) and CFA (Study 2), examine the reliability of the FRI in terms of internal consistency (Studies 1 and 2), and provide convergent evidence of validity (Studies 1 and 2).

TABLE 4 Correlations between FRI scores and measures of convergent validity (two-tailed Pearson's r , 95% CI) (Study 1, $N = 250$)

	Need for reparation	Fear of punishment	Hope
Manic reparation	0.19** (0.07, 0.31)	-0.05 (-0.17, 0.07)	0.23*** (0.10, 0.34)
Expiatory reparation	0.17** (0.04, 0.29)	0.25*** (0.13, 0.36)	-0.16* (-0.27, -0.03)

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

Abbreviations: CI, confidence interval; FRI, fertility reparation inventory.

Regarding the factor structure of the FRI, the EFA results confirmed a two-factor solution explaining 64.18% of the variance of the original items and showed good psychometric properties of the FRI, with very good internal consistency (Cronbach's $\alpha \geq .85$) for manic and expiatory reparation in both the studies. The results of CFA indicated an adequate fit of the two-factor model of the FRI in terms of latent constructs, which were independent and uncorrelated in line with our theoretical framework (Caputo et al., 2020a; Klein, 1959). About the convergent evidence of the FRI scores in women undergoing ART, correlation analyses confirmed all our study hypotheses showing that both manic and expiatory reparation were positively associated with omnipotence, thus revealing their defensive nature as pseudo-reparations. In this regard, previous research has reported increased use of defense mechanisms by women with infertility problems compared to controls, especially immature and distorting defenses (Jaan & Sultan, 2017). Indeed, women with infertility problems tend to use more irrational beliefs (Katiraei et al., 2010) and magical thinking (Apfel & Keylor, 2002). Those undergoing medically assisted reproductive procedures often express illusory attempts to control the future through one's ideal convictions or powerful self-assertion in searching for a baby at all costs, thus posing no limit on ART attempts (Cipolletta & Faccio, 2013; Fedele et al., 2020).

Besides, only expiatory reparation was positively associated with perceived infertility-related stress, as well as with anxiety and depression measures with medium to high effect sizes. As regard with this, the overwhelming experience of guilt (proper of expiatory reparation) in women undergoing ART has been reported in past research, highlighting feelings of grief, self-deprecation, stigma, shame, and threat due to the unmet parenthood expectations and perceived social pressure to procreate (Fedele et al., 2020; Yao et al., 2018). Such guilt feelings represent a significant source of infertility distress that often leads to increased anxiety and depression in pathways of medically assisted reproduction and is further enhanced when faced with treatment failures (Pozza et al., 2019).

Regarding the convergent evidence of the FRI scores in women from the general population with similar age, manic and expiatory reparation were correlated with the need for reparation. The deprivation of maternal experience and the consequent sense of injustice is among the most commonly reported issues of persons with infertility problems (Alamin et al., 2020). Women facing fertility challenges usually do not see much beyond the pregnancy, so they work diligently to conceive and identify themselves with the symbolic community of procreative mothers, as to repair self-image and generative identity (Galasso et al., 2017; Langher et al., 2019).

However, only expiatory reparation was associated with the fear of punishment. Indeed, women may interpret infertility as a sort of punishment from a higher power for their past sins (Ntiamoah, 2018). As well, the fear of punishment characterizing expiatory reparation makes them prone to bear all the efforts and sufferings it takes to achieve a pregnancy, despite acknowledging the low success rate of ART (Fedele et al., 2020). This persecutory anxiety results in a compulsive repetition of ART attempts as a process of constant self-traumatization featured by paranoid ideation and prolonged exposure to invasive infertility treatments (Corley-Newman, 2017; Mann, 2014).

Then, hope was positively associated with manic reparation and negatively associated with expiatory reparation, consistently with our theoretical framework suggesting the diverse nature of the examined forms of pseudo-reparation. Indeed, whereas manic reparation has a narcissistic vein aimed at preserving self-confidence and hope through the control over the desired object, expiatory reparation involves constant despair due to the identification with the lost object (Klein, 1935). In this regard, it is interesting to note that previous research has reported being pessimistic as a risk factor for ART treatment failure, despite being more optimistic was not necessarily associated with better outcomes (Bleil et al., 2012). This appears in line with our findings because, whereas pessimism is undoubtedly intertwined with higher psychological distress, optimism may reveal a defensive process featured by a sense of idealization and unrealistic expectations as suggested by infertility-related studies of bereavement (Fisher & Hammarberg, 2020).

6 | LIMITATIONS AND IMPLICATIONS FOR PRACTICE

Some limitations exist regarding the present study. First, the convenience nature of the clinical sample (that was recruited from only one ART center) and of the general population sample does not allow any generalization, since self-selection bias may exist. Second, the cross-sectional and correlational nature of the study does not allow disentangling the complex interrelations among the examined variables and establishing possible causal relations. Besides, since the used samples were almost entirely composed of Italian participants, the transcultural validity of the present findings should be tested in further international validation studies. Indeed, some socio-cultural and context-related effects could shape different meanings about the procreative function and the consequent efforts to restore it through resorting to ART. As well, the measures validated in the present study could work differently depending on specific individual variables (e.g., age class, marital status, infertility causes, previous pregnancy), thus requiring future research examining measurement invariance across different groups in larger samples. Then, it should be acknowledged that the collected convergent evidence about the FRI scores sometimes highlights modest correlations with small effect sizes. Anyway, this can be probably due to the lack of convergent measures grounded on a solid psychodynamic background (as in the case of hope) or of alternative psychodynamic measures specifically developed in the ART field (e.g., omnipotence, need for reparation, fear of punishment).

Notwithstanding these limitations, the present validation study provides a meaningful contribution in both theoretical and empirical terms from a psychodynamic lens. The concept of pseudo-reparation can be, indeed, very useful for the understanding of emotional dynamics and psychological issues underlying the demand for ART, which could be addressed in the education and training of healthcare providers. As well, this may contribute to making sense of potential conflicts in the therapeutic relationship and promoting more reflective practices in medical and nursing professions dealing with ART. Besides, the here validated measures also have a very significant practical value in the field of ART treatment. On the one hand, the FRI can be intended as a screening tool to be employed in the initial welcome and early stages of the therapeutic relationship. It may allow exploring patients' excessive or dysfunctional expectations that make them more emotionally vulnerable and at risk of developing psychological distress at a later stage. Indeed, it could contribute to detecting those needing more effective information on the ART procedures and potential psychological support to favor a greater realism about their condition and the probability of treatment success. On the other hand, the FRI could be fruitfully used also to monitor the patients' imaginative capacity to mourn their infertility-related loss over the course of the ART treatment, especially when faced with treatment burden and failures. Then, such an instrument may widen and further promote the scientific research on the psychological factors that are generally associated with treatment nonadherence and discontinuation in women undergoing ART.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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