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ORIGINAL ARTICLE *Psychology and counselling*

Dyadic dynamics of perceived social support in couples facing infertility

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STUDY QUESTION: Is perceived social support from partner, family, and friends associated with increased infertility-related stress?

SUMMARY ANSWER: While men's perceived support did not seem to influence their partners' stress, women's perceptions of spousal and familial support can affect the way men deal with the challenge of infertility.

WHAT IS KNOWN ALREADY: Previous studies showed that low levels of social support are associated with poor psychosocial adjustment and treatment termination in women and men. Studies examining the impact of social support using the couple as unit of analysis are lacking.

STUDY DESIGN, SIZE, DURATION: A cross-sectional sample of 613 Portuguese patients participated in the research, online over a 3-month period, and in a public fertility clinic over 11 months.

PARTICIPANTS/MATERIALS, SETTING, METHODS: The final sample comprised 213 married or cohabiting couples (191 from the fertility clinic) who were actively attempting to have a child, were seeking infertility treatment and had not undergone previous preimplantation genetic diagnosis. Perceived social support was assessed through the Multidimensional Scale of Perceived Social Support and infertility-related stress was assessed with the fertility problem inventory. Hypotheses were tested by applying the actor–partner interdependence model using structural equation modeling.

MAIN RESULTS AND THE ROLE OF CHANCE: Couples had been living together for an average ($\pm$SD) of 6 $\pm$ 3.5 years, and attempting a pregnancy for 3.8 $\pm$ 2.6 years. Nearly half of the couples had undergone infertility treatment (41.3%). Infertility stress was found to be associated with low family support for women ($\beta = -0.27$, $P = .003$), and low partner support for both men ($\beta = -0.29$, $P = .001$) and women ($\beta = -0.45$, $P = .006$). Both women and men's perceived friend support were not significantly related to male or female infertility stress. Men infertility stress was also associated with their partners low levels of partner ($\beta = -0.24$, $P = .049$) and family support ($\beta = -0.23$, $P < .001$). No significant partner effects were observed for women. Despite being related to actor effects alone (female partner and family support), the explained variance of the model in women's fertility stress was greater ($R^2 = 21\%$) than that ($R^2 = 15.6\%$) for the combined actor and partner effects in men's fertility stress (male partner support, female partner and family support).

LIMITATIONS, REASONS FOR CAUTION: The study data are cross-sectional and the generalizability of results is limited by self-selection. The characteristics of non-participants in both the clinical and online samples were not available, the perception of infertility-specific supportive behaviors was not assessed and differential analyses according to infertility diagnosis were not included in this study.

WIDER IMPLICATIONS OF THE FINDINGS: Our data underline the importance of partner support in alleviating the burden of infertility. Men may experience infertility indirectly through the impact that it has on their partners. Our findings reinforce the need to involve the male partner throughout the whole treatment process and for couple-based interventions when providing infertility counseling. Further prospective research should be aimed at investigating the male experience of infertility.

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Key words: social support / infertility stress / marital relationship / dyadic analysis

Introduction

There is now extensive research demonstrating that experiencing infertility is physically and psychologically stressful in all cultures and societies (Greil *et al*., 2010). While the majority of psychosocial studies focus on emotional maladjustment and risk factors in infertile patients (Verhaak *et al*., 2007; Deka and Sarma, 2010), there is a lack of research on the impact of protective effects, such as the potential positive impact of social interactions, on the severity of infertility-related stress in men and women (Verhaak *et al*., 2005; Lund *et al*., 2009; Mahajan *et al*., 2009; Schmidt, 2009; Greil *et al*., 2010).

Social support plays a key role in how an individual adjusts to a life crisis. Social support is typically perceived as having an available confidant or experiencing caring attitudes from a specific source (Cohen and Wills, 1985; Walen and Lachman, 2000). One of the key theoretical models related to social support is the stress buffering hypothesis. This model states that in the event of a stressful experience those who have social support will suffer less from the potentially harmful effects of that particular occurrence, thus facilitating adaptation (Cobb, 1976; Cohen and Wills, 1985).

Evidence for the association between social support and adjustment to numerous life stressors is well documented (see reviews in Uchino, 2006; Decker, 2007; Casale and Wild, 2012). In samples including men and women facing infertility, general social support has been associated with lower levels of depression, anxiety and fertility-related stress (Verhaak *et al*., 2005; Lechner *et al*., 2007; Martins *et al*., 2013). Women seem to adjust better to the stress of infertility when they perceive higher social support from specific sources such as partners (Gibson and Myers, 2002; Martins *et al*., 2011), family (Gibson and Myers, 2002; Mahajan *et al*., 2009; Martins *et al*., 2011) or friends (Martins *et al*., 2011). Receiving social support from a significant partner has also been associated with lower levels of depression in men (Lund *et al*., 2009). Finally, low family support predicts treatment termination after 1 year for both men and women (Vassard *et al*., 2012).

Interdependence refers to the process where one individual's emotions, cognitions and behaviors influence his or her partner's emotions, cognitions and behaviors (Kelley *et al*., 1983, 2003). As the shared stress produced by experiencing infertility increases, stress management resources of both husband and wife are activated as a coupled unit. There are four key reasons for using the dyad as the unit of analysis to examine the impact of infertility-related stress. First, although there are growing data confirming the stress buffering hypothesis in infertility adjustment, there are no studies examining the impact of social support using the couple as a unit of analysis. Secondly, in addition to confronting the infertility stressor independently, both members of the couple confront it together as an interdependent dyadic unit. Thirdly, past evidence suggests that the level of adjustment to low-control situations is influenced by the degree to which partners perceive support from each other (Kinsinger *et al*., 2011; Thompson *et al*., 2012a,b). Fourthly, interdependence seems to be even more relevant in the context of infertility—even when only one member of the couple is diagnosed—as it is undoubtedly a condition that affects both members of the couple who had decided to jointly pursue the transition to parenthood (Greil *et al*., 2010). The importance of studying the experience of infertility in couples using the couple as the unit of analysis has been emphasized in recent studies (Peterson *et al*., 2008; Johnson and Johnson, 2009). One member of the couple can influence the other's psychosocial adjustment or fertility stress through perceptions of controllability (Benyamini *et al*., 2009) or of the likelihood of becoming pregnant (Thompson *et al*., 2012a,b), depressive symptoms (Knoll *et al*., 2009) or the use of coping strategies (Berghuis and Stanton, 2002; Peterson *et al*., 2006a,b, 2008, 2009, 2011). This paper specifically examines whether each partner's perceived social support influences the other's way of adjusting to infertility stress. The aim of the study was to investigate whether women and men's perceived social support from family, friends and partner was associated with their own, as well as their partner's, infertility-related stress.

Materials and Methods

Sample and recruitment

Participants completed the study questionnaires through two non-representative (convenience) data collection methods: (a) at the Portuguese Fertility Association online forum ($n = 202$, 175 women, 27 men); (b) at a large regional public fertility center ($n = 411$, 216 women and 195 men). The option to participate via an online questionnaire was sought to increase the number of male participants. Patients attending the public fertility center at the hospital were asked by their physician to participate in the study at the conclusion of their appointment. In a separate room, and after reading the study information sheet and signing the consent form, participants completed the questionnaire in the presence of the first author. Individuals accessing the Portuguese Fertility Association internet forum had an invitation requesting participation and providing them with instructions to complete an online survey. Prior to data collection, the study methods and procedures were approved by the Hospital Ethics Committee and by the Portuguese Data Protection Authority. The questionnaire was available online between October and December 2009, and data were collected from the fertility center sample between February 2010 and March 2011.

Our initial sample had 613 subjects (391 female and 222 male). In this study, we included only married or cohabiting couples who (a) were actively attempting to have a child; (b) were seeking treatment; and (c) were not seeking or receiving infertility treatments due to a previous preimplantation genetic diagnosis. Members of couples were matched in our database by asking each participant for their own and their partners' name initials and date of birth. Our final sample had 213 couples (426 subjects), the majority of whom were patients at the fertility center ($n = 191$ couples). Couples were living together for an average of 6 years (SD 3.5), and attempting a pregnancy for 3.8 years (SD 3.8). Nearly half of the couples had undergone infertility treatment (41.3%). Subjects were in their early thirties, with men being older (mean 34.3 years, SD 6.2) than women (mean 32.3 years, SD 4.9). Online and clinical samples were similar in all these characteristics ($P > 0.05$), except for infertility treatment, with a significantly higher proportion of online respondents having undergone fertility treatment ($\chi^2 = 11.77$, $P = 0.001$). A multivariate analysis of variance (MANOVA) revealed no significant effect of having received fertility treatment on any of the variables used in this study ($F(8180) = 0.80$, $P > 0.05$).

Measures

Social support

Perceived social support was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet *et al*., 1988). The MSPSS is a 12-item self-report screening instrument that measures the perceived adequacy of social support received from three sources (four items each): family (e.g. 'I get the emotional help and support I need from my family'), friends (e.g. 'I can count on my friends when things go wrong') and the significant other (e.g. 'There is a special person with whom I can share joys and

sorrows'). The MSPSS has proved to have good validity and reliability (Zimet *et al.*, 1988, 1990; Dahlem *et al.*, 1991). The current study used the Portuguese version of the instrument (MSPSS-P) (Martins *et al.*, 2012). Subscales were found to have high internal consistency estimates (0.93 for Family, 0.94 for Friends and 0.89 for Partner), and a confirmatory factor analysis (CFA) revealed good goodness-of-fit [comparative fit index (CFI) = 0.96].

Infertility stress

The fertility problem inventory (FPI; Newton *et al.*, 1999) measures perceived infertility-related stress. The FPI is composed of 46 items and is a valid and reliable measure, producing a global infertility stress score as well as 5 subscales scores (Newton *et al.*, 1999). The version used in this study is based on the Portuguese population adaptation (Moura-Ramos *et al.*, 2012). Even though the rejection of childfree lifestyle subscale and some of the other subscales items were dropped because they did not reach adequate saturation or they decreased reliability, the four retained domains revealed good internal consistency: social concern (seven items; $\alpha = 0.85$), sexual concern (six items; $\alpha = 0.76$), relationship concern (seven items; $\alpha = 0.76$) and need for parenthood (three items; $\alpha = 0.71$). The final CFA model showed good goodness-of-fit (CFI = 0.95), and Cronbach's alpha for the global score was 0.88.

Data management and analysis

Bivariate associations between latent variables were computed to determine the degree of interdependence between male and female data (Cook and Kenny, 2005). To test our hypotheses, we employed the actor–partner interdependence model (APIM) with distinguishable dyads (Kenny *et al.*, 2006) using structural equation modeling (SEM) in AMOS 19 software (IBM Statistical Package for the Social Sciences) with maximum-likelihood estimation. SEM allows one to test relationships between sets of latent variables simultaneously and thus compare magnitudes of competing regression paths. In this study, the actor effect was the impact of an individual's social support from different sources (partner, family and friends) on his or her own fertility-related stress. The partner effect was the impact of an individual's social support on his or her partner fertility stress. Error variances of latent variables and errors of measurement in observed variables were allowed to covary across dyad members to control for interdependence. To assess the quality of the hypothesized model, we used three goodness-of-fit indices and followed the guidelines of Hooper *et al.* (2008) for good fit: ≥ 0.90 for the CFI, <5 for the χ^2 ratio (χ^2/df) and ≤ 0.07 for the root mean square error of approximation (RMSEA).

Results

Couples had been living together for an average ($\pm$ SD) of 6 $\pm$ 3.5 years, and attempting a pregnancy for 3.8 $\pm$ 2.6 years. Nearly half of the couples had undergone infertility treatment (41.3%). Subjects were in their early thirties, with men being older (mean 34.3 years, SD 6.2) than women (mean 32.3 years, SD 4.9). Online and clinical participants were similar in all these characteristics ($P > 0.05$), except for infertility treatment, with a significantly higher proportion of online respondents having undergone fertility treatment ($\chi^2 = 11.77$, $P = 0.001$). A MANOVA revealed no significant effect of having received fertility treatment on any of the variables used in this study ($F(8180) = 0.80$, $P > 0.05$). Pearson correlations between perceived social support from partner, family and friends, and fertility-related stress among infertile couples are shown in Table I. Both for women and men, positive and significant correlations were observed between social support from all three sources, and these were negatively and significantly associated with fertility-related stress. Results for correlations among same variables in the dyads showed that the more support and fertility stress a dyad member perceived, the higher their partner score. Women's perceived social support from family and friends (but not partner support) was negatively and significantly correlated with fertility stress in their male partners. Men's perceived social support from their partners and families (but not friend support) was negatively and significantly correlated with fertility stress in their female partners.

The SEM model examined the fertility-related stress both female and male partners regressed onto six predictors (perceived adequacy of support from partner, family and friends for each couple member). Neither women's nor men's perceived friend support were significantly related to the outcomes (female and male fertility stress). Figure 1 depicts the significant actor and partner relationships between social support and fertility stress and respective beta values. This final model had a good overall fit, $\chi^2(229) = 474.07$, $P = 0.000$, $\chi^2/\text{df} = 2.07$, CFI = 0.92, RMSEA = 0.07 (90% confidence interval = 0.062–0.080).

Table I Pearson correlations and mean values obtained for the subscales of perceived social support and fertility-related stress for women and men (n = 213 infertile couples).

Variable	1	2	3	4	5	6	7	8
1. Partner support (female)	—							
2. Partner support (male)	0.192[a]	—						
3. Family support (female)	0.443[a]	0.132	—					
4. Family support (male)	0.065	0.487[a]	0.233[a]	—				
5. Friend support (female)	0.312[a]	0.059	0.480[a]	0.259[a]	—			
6. Friend support (male)	0.063	0.401[a]	0.262[a]	0.545[a]	0.380[a]	—		
7. Fertility-related stress (female)	−0.318[a]	−0.202[a]	−0.344[a]	−0.110	−0.195[a]	−0.172[b]	—	
8. Fertility-related stress (male)	−0.047	−0.291[a]	−0.272[a]	−0.200[a]	−0.182[a]	−0.178[b]	0.355[a]	—
Mean	5.61	5.53	5.13	4.88	4.75	4.38	2.48	2.12
SD	0.96	0.78	1.08	1.11	1.30	1.20	0.96	0.76

[a]$P < 0.001$.
[b]$P < 0.05$.

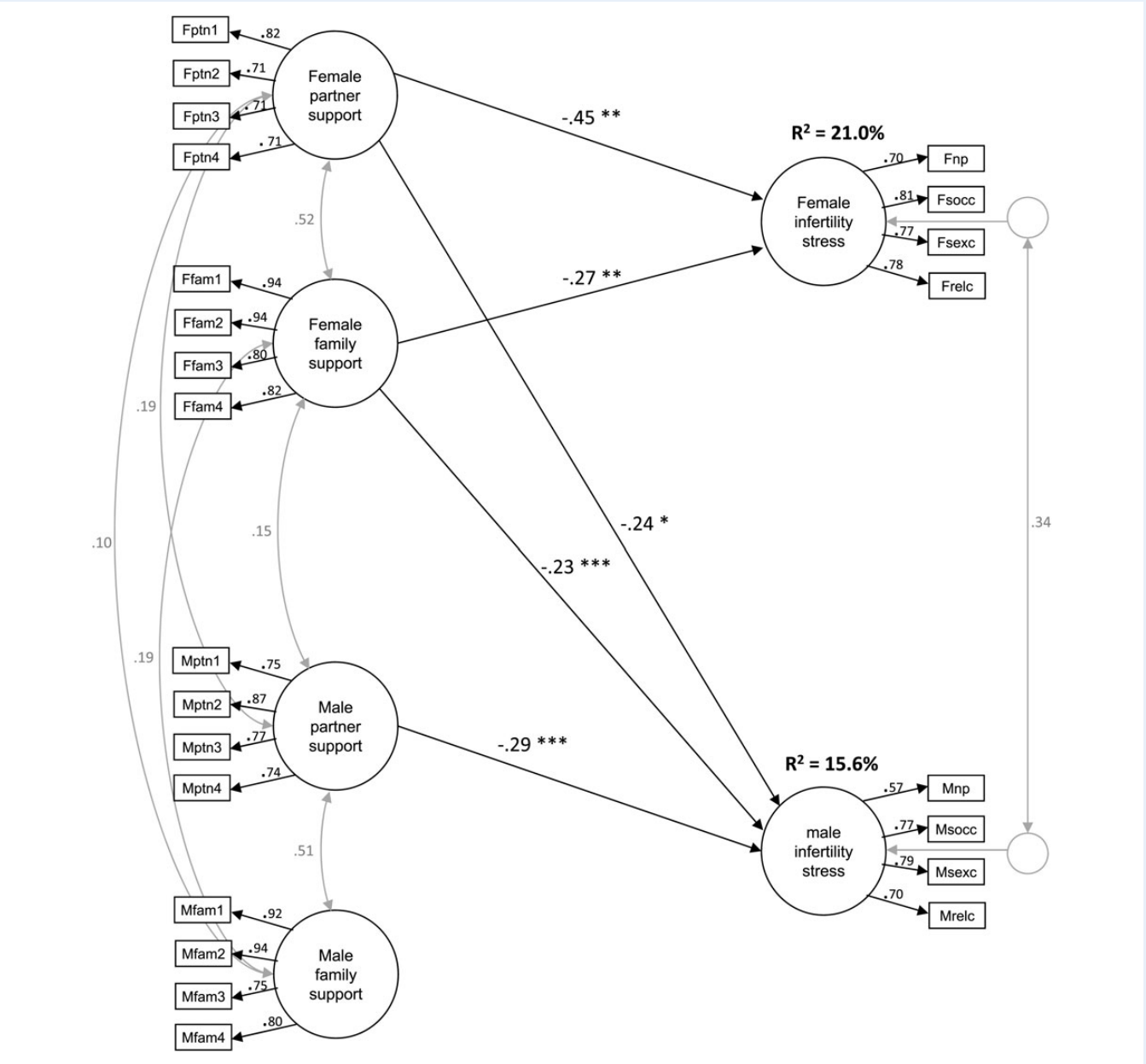

Figure 1 Actor and partner effects of perceived social support on infertility stress: final structural model and standardized estimates of factor loadings and regression coefficients. Latent constructs are shown within circles, parceled observed variables are shown within rectangles, and correlated error disturbance terms and standardized correlations are shown in gray. Only significant effects are shown in the picture. Signs of beta weights mark the direction of the effect. *$P \leq 0.05$; **$P \leq 0.01$; ***$P \leq 0.001$

Actor effects were verified both for men and women. Perceived support from partner was negatively associated with fertility stress for men ($\beta = -29, P \leq 0.001$) and women ($\beta = -45, P = 0.006$). A negative association between women's perceived family support and women's fertility stress ($\beta = -27$, $P = 0.003$) was revealed. However, this relationship was not significant for men. While no significant partner effects were observed for women, two partner effects were found in men's fertility stress. Women's perceptions of the amount and quality of social support received both from their partners ($\beta = -24$, $P = .049$) and their family members ($\beta = -23, P < 0.001$) were negatively associated with men's fertility stress. The combined actor and partner effects accounted for 15.6% of the variance in men's fertility stress. Although it was due to actor effects alone, the explained variance of the model in women's fertility stress was greater than that of men ($R^2 = 21\%$).

Discussion

This study was conducted to determine the independent and interdependent influence of perceived social support from three different sources (partner, family and friends) on infertility stress in a sample of couples seeking infertility treatment. To the authors' knowledge, this is

the first study to examine actor and partner effects of social support on the stress associated with infertility. Using the APIM method to examine men and women' self-reports in a single analysis, we found only actor effects in women, but more partner than actor effects in men.

The relationship between perceived partner support and infertility stress was the strongest association found both for men and women. This link was the only actor effect that remained significant for men. In women, while the association between family support and infertility stress was also significant, the effect of partner support was of particularly high magnitude. This result is consistent with existing studies on the positive influence of partner support on fertility stress in women (Gibson and Myers, 2002; Martins *et al.*, 2011), and on depression in men (Lund *et al.*, 2009). The finding is not surprising given that the marital relationship is one of the primary sources of support in times of stress (Walen and Lachman, 2000; Iida *et al*., 2008). Moreover, previous research focusing on the consequences of infertility within marriage found that couples that had been through fertility treatment often describe strong marital adjustment (Leiblum *et al*., 1998; Daniluk, 2001). Furthermore, some studies that have investigated the impact of infertility on marital adjustment have noted that couples who undergo infertility treatment report that they have become closer and that their relationship has strengthened following the diagnosis of infertility (Schmidt *et al*., 2005; Sydsjö *et al*., 2005).

Results also revealed that family support can have a protective effect on women's infertility stress, which is also consistent with previous evidence obtained with samples of women (Gibson and Myers, 2002; Mahajan *et al.*, 2009; Martins *et al.*, 2011). In our model, this relationship was not noted for men, but to the best of our knowledge there are no studies in men to corroborate our finding. Nevertheless, women are more open than men to communicating their feelings about the process of attempting to have a child (Wright *et al*., 1991). Additionally, women tend to have a higher emotional involvement with their families than men (Kessler and Mcleod, 1984), and when confronted with infertility mobilize more social support than men (Cousineau and Domar, 2007).

It is possible that in regards to male infertility stress, female partners are the only sources of support that can ease the challenging nature of this particular crisis. In fact, the woman's role seems to be so important that only variables directly or indirectly related to the partner were found to be significantly associated with male infertility stress. This might be due to the fact that men have a greater tendency to suppress their emotions about infertility than women (Karlidere *et al*., 2007; Keylor and Apfel, 2010), and only seek social support together with their partners as a joint activity and hence do not benefit from it as much as women (Peterson *et al*., 2006a,b). Even though the magnitude of the actor effect was greater in men than the observed partner effects, it is not common to have more partner than actor effects, since the link between one's view with one's behavior is expected to be more direct (Furman and Simon, 2006). Thus, the most important finding of this study was the negative association between women's perceived partner and family support and men's infertility stress. The results of this study reinforce the idea that men may experience infertility indirectly through the impact that it has on their partners (Greil, 1991) by focusing mainly on her well-being (Hjelmstedt *et al*., 1999). For men, the stress associated with infertility can be eased not only through receiving support from their partners, but also through their partners' perception that they are being highly supported by them. This finding is in accordance with the Pasch *et al.* (2002) argument that for men the perception of the impact of infertility on their self-esteem is closely related to the perception of its impact on the marriage.

The intimate relationship and the way women feel supported can be so important for men that even the female partners' perception of having family members on whom they can rely on seems to have a beneficial effect on male partners' infertility stress. Support from other sources has a protective effect on marriage (Patterson, 2002), and previous evidence has shown that social support from relatives, friends and workmates has a beneficial effect on infertility marital stress (Martins *et al.*, 2013). It is surprising that the female partner family support had an effect on the male partner infertility stress but his own family support did not. Because the distress caused by infertility and the stability of the relationship seem to be intertwined concepts for men, it is possible that men feel that the burden of infertility stress is lessened by knowing their partners are also being supported by other family members. In other words, men feel responsible for supporting their partners throughout the infertility process (Malik and Coulson, 2008), and sharing this responsibility can reduce male infertility-related stress.

In both men and women, neither actor nor partner associations with friends social support were significant. Infertility is a stigmatized identity, and couples may receive unhelpful support from peers or friends who are often fertile themselves (Mindes *et al.*, 2003; Slade *et al.*, 2007). This does not mean that seeking support from friends will not be helpful in some specific domains of infertility-related stress. For example, social support from friends is negatively associated with infertility social stress through the use of active-confronting coping (e.g. letting feelings out; Martins *et al.*, 2011). It is possible that perceiving high social support from friends can have actor and partner effects on infertility-related stress through other mediators that this study did not access.

This study has some important limitations that should be noted. First, the cross-sectional design of this study does not allow us to draw causal inferences from these data. We also did not have access to non-participants characteristics both in the clinical and the online samples. It is possible that self-selection bias limits the generalizability of our findings to other couples that do not volunteer to participate in research studies. These results also do not reflect the perceptions of those couples who decide not to pursue infertility treatment. Additionally, while we accessed perceived social support from different contexts, we did not include infertility-specific supportive behaviors (for example, receiving the appropriate support when sharing the emotional burden of treatments with friends), nor support provision, frequency of contact, quality of relationships or social support network size. Because each infertility treatment involves several stages and stress levels vary according to these stages (Boivin *et al*., 1998), it would be interesting to analyze independent daily reports of support collected from each couple member. Finally, differential analyses according to diagnosis were not included in this study. It is possible that results would be different when controlling for infertility causality. Even though recent studies did not find differences in infertility-related stress between diagnosis groups (e.g. Peronace *et al.*, 2007), there is evidence indicating that a male factor diagnosis is associated with higher infertility distress (Glover *et al.*, 1996). However, there are reasons why this research valuable; this is the first study to investigate the relationship between social support and infertility stress within couples seeking treatment for infertility using a technique that accounts for the interdependence of observations. Also, even though we cannot make claims of directional influence, we used a solid theoretical model that helps mitigate causality

concerns. Additionally, well-validated measures of social support and fertility-related stress were used in this study.

Although this study provides a valuable starting point, more analyses on the relationship between social support from different contexts and infertility adjustment are needed to advance psychosocial and counseling intervention that target the infertile dyad. In addition to evaluating the adequacy of the support each partner is providing to the other, mental health professionals can assist each member of the couple in providing and receiving appropriate feedback about the ways they need and want to be supported. Given our male partner effects results, men can particularly benefit from receiving feedback. It might also prove helpful for physicians, embryologists and nurses to strongly encourage the involvement of men in the treatment decision-making process, as well as target those couples who do not feel supported by their families, particularly women. Our findings clearly demonstrate that assessing only the male or female perspective provides a very narrow comprehension of the emotional struggles the couple might be going through as they face the possibility of not becoming biological parents.

In summary, the present study highlights the need for a deeper understanding of the benefits of social support, and of the social construction of the male experience of infertility (Greil *et al.*, 2010). Our findings underline the importance of partner support in alleviating the burden of infertility, and suggest that women's high perception of social support from their partners and families can decrease both female and male fertility stress. Further studies focusing on the prospective effects of social support on infertile couples and on the specific nature of the male experience of infertility would be valuable in broadening the current knowledge base.

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Authors' roles

M.V.M. was responsible for data collection and analysis and drafted the manuscript. All authors participated in the concept and design of the study, as well as interpretation of data, draft revisions and approval of manuscript submissions.

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Conflict of interest

The authors did not have conflicts of interest.

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