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Perceived Threat of Infertility and Women's Intention to Anticipate Childbearing: The Mediating Role of Personally Perceived Barriers and Facilitators

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Abstract
To study the role of perceived threat of infertility, barriers, and facilitators in intention to anticipate childbearing, a cross-sectional study was conducted with 240 women desiring to have children and committed in a heterosexual relationship. Participants answered an online survey between July 2016 and February 2018. Results showed that perceiving infertility as a strong barrier and being willing to use fertility treatment as a facilitator fully mediated the effect of perceived threat on intention to anticipate childbearing. In conclusion, women who perceive themselves at risk of being infertile will consider, to a higher degree, infertility as a strong barrier to achieve their reproductive life plan or will report higher willingness to use fertility treatments, which in turn would increase intentions to anticipate childbearing. Since evidence showed lack of fertility awareness, intervention initiatives should target these mediators.

Keywords Infertility prevention · Reproductive life plan · Fertility awareness · Women · Health belief model

Introduction

Increasing the population's fertility awareness has been seen as an urgent health education priority (Harper et al., 2017). Young people are not sufficiently aware of fertility issues and infertility risk factors and over-estimate the success rates of fertility treatment (for reviews see Hammarberg, Collins, Holden, Young, & McLachlan, 2017; Pedro, Brandão, Schmidt, Costa, & Martins, 2018). Family building in western countries is characterized by delaying first childbirth, as well as by a reduction in the mean number of children per woman. In 2016, the mean age of women at first childbirth in Europe was 30.6 years old (Pordata, 2016) and the total fertility rate was 1.6

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(Pordata, 2017). It has been hypothesized that the postponement of childbearing is influenced by the low levels of fertility awareness. However, few studies have looked on the relationship between fertility awareness and attitudes or intentions regarding individuals' reproductive plans. What these existent studies found is that an increase of fertility awareness was related to a decrease in the desired age for the first child (Daniluk & Koert, 2015; Wojcieszek & Thompson, 2013), and lower intentions to postpone childbearing (Williamson, Lawson, Downe, & Pierson, 2014).

Therefore, more knowledge about what may contribute to people taking actions towards their reproductive decisions is needed. Infertility is a health condition influenced by lifestyle habits and other behaviors, and it is found to cause psychological strain (Martins et al., 2016; Verhaak et al., 2007). Smoking, drinking alcohol, obesity, sexually transmitted infections, and postponement of childbearing to later ages are important risk factors for infertility (Anderson, Nisenblat, & Norman, 2010; Homan, Davies, & Norman, 2007; Sharma, Allgar, & Rajkhowa, 2002). Individual fertility and reproductive outcomes may be positively affected by changing unhealthy lifestyle habits or undertaking fertility-promoting behaviors (Collins & Rossi, 2015), such as staying normal weight and avoiding smoking, trying to have children at younger ages (anticipating childbearing), and seeking medical help in a timely manner. Understanding what may contribute to changing health behaviors related to fertility is crucial. For a better understanding of this, we use the Health Belief Model (HBM) (Champion & Skinner, 2008; Hochbaum, Kegels, & Rosenstock, 1952). This is a theoretical framework for understanding health behavior and emphasizes that individuals will take action towards adopting healthy behaviors or avoiding risky behaviors if (a) they perceive themselves as susceptible to the disease, (b) consider the consequences of the disease severe enough, (c) believe that action would bring benefits or decrease the risk, (d) believe that the benefits outweigh the barriers, (e) have the presence of a "trigger" that motivates action (cues to action/facilitators), and (f) believe that they have enough self-efficacy to take action (Champion & Skinner, 2008; Hochbaum et al., 1952; Rosenstock, 1974). Studies on other health conditions have found that education programs based on HBM were effective in changing health behaviors, such as in the context of osteoporosis (Brecher et al., 2002) or obesity prevention (Noorbakhsh, Mostafavi, & Shahnazi, 2017). Specifically, perceived susceptibility has both direct and indirect effects on intention to undertake colorectal cancer screening (McQueen et al., 2010), and perceived barriers have been found to negatively impact the undertaking of preventive oral care behaviors (Buglar, White, & Robinson, 2010), healthy eating behaviors (Orji, Vassileva, & Mandryk, 2012) and health behaviors in general (Carpenter, 2010; Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004).

In the context of fertility, it might mean that individuals will be more willing to undertake fertility-optimizing behaviors, such as not smoking or having children at an earlier age, if they feel infertility as a threat. Most young people desire to have children in the future (Conceição, Pedro, & Martins, 2017; Ekelin, Åkesson, Ångerud, & Kvist, 2012; García, Vassena, Trullenque, Rodríguez, & Vernaeve, 2015; Sørensen et al., 2016; Virtala, Kunttu, Huttunen, & Virjo, 2006). However, we do not know the mechanisms that can help to explain why people take or not actions regarding their reproductive plans. Some studies have provided some evidence on potential mechanisms explain taking action regarding reproductive plans. One important mechanism may be fertility knowledge. For instance, Fulford and colleagues found that women trying to conceive were more likely to take actions to improve their chance of conceiving when they were knowledgeable about fertility and felt susceptible to infertility (Fulford, Bunting, Tsibulsky, & Boivin, 2013). Another study found that people felt more susceptible to infertility after receiving fertility information (Boivin et al., 2018). Being susceptible to infertility seems to be the first factor to be motivated to adopt fertility-protective behaviors. Since evidence showed that the postponement of childbearing to later ages seems to be related to barriers, such as financial concerns, finishing education, and absence of partners (Mills, Rindfuss, McDonald, & te Velde, 2011; Petersen et al., 2015) even when parenthood is a major goal for the majority of people. For these reasons, exploring the role of these barriers (career aspirations, educational goals, personal interests, not feeling emotionally prepared, financial concerns and infertility) and facilitators (willingness to undergoing fertility treatment, adopting a child/children, or choosing to stay childless) as possible mediators in childbearing intentions seems crucial. If these barriers are perceived at a high level, they may reduce the likelihood of undertaking health behaviors, even if the individual has adequate knowledge or feels susceptible to the problem (Rosenstock, 1974; Sheeran, 2002). On the other hand, facilitators may contribute to increase the likelihood of undertaking health behavior. For example, if a person feels susceptible to infertility, they would perceive at a higher degree that suffering from infertility would be a real barrier to achieving childbearing, which in turn may influence their willingness to have a child earlier than planned. Or if a person feels susceptible to infertility, this will increase the fear of staying childless (indicating that having children is highly important for them), which in turn may influence their willingness to try to conceive earlier than planned.

This study explores the mechanisms behind the relationship between perceived threat of infertility and intention to anticipate childbearing in women who desired to have children. We hypothesized that perceived threat of infertility would influence intentions to anticipate childbearing

and that this association would be mediated by personally perceived barriers (career aspirations, educational goals, personal interests, not feeling emotionally prepared, financial concerns and infertility) and facilitators (willingness to undergoing fertility treatment, adopting a child/children, or choosing to stay childless). Identifying specific barriers and facilitators may provide some information about important targets of fertility awareness campaigns, as well as for the promotion of preventive actions.

Methods

Procedures and Participants

For this cross-sectional study, childless women were invited to participate, between July 2016 and February 2018, at private gynecology clinics, pre-marital courses, and through social networks in Portugal. The eligibility criteria were as follows: being involved in a romantic heterosexual relationship for at least 1 year, desiring to have children in the future, being between 20 and 45 years of age, not having knowledge of a fertility problem, and not actively trying to conceive for more than 12 months (or 6 months if the woman was 35 years old or over). Participants were informed about the goals of the study; those who agreed to participate were asked to answer an online questionnaire on tablets available for this purpose or on their personal computers at home, according to their preferences. This study was approved by the Ethical Committee of the Faculty of Psychology and Education Sciences of University of Porto and conducted according to the Declaration of Helsinki for Medical Research involving Human Subjects.

Questionnaire Development and Measures

The online self-report questionnaire was developed by senior researchers (psychologists and medical doctors) and fertility specialists (gynecologists) working in the field of reproductive health. The questionnaire was developed based on previous research addressing fertility intentions and the undertaking of protective fertility behaviors (Boivin et al., 2018; Fulford et al., 2013; Stern, Larsson, Kristiansson, & Tydén, 2013). A first version of this questionnaire was pretested in 5 people with similar characteristics to those of the study population and it was restructured based on their remarks and comments. The questionnaire included sociodemographic data (age, education level, and relationship length), health-related data (knowledge of fertility problems, being actively trying to conceive, time trying to conceive), and the following measures:

Reproductive Life-Plan

Number of children desired; expected age at first and last child; confidence about being able to have the desired number of children within the desired ages, answered on a scale from 1 (low confidence) to 5 (high confidence).

Intention to Anticipate Childbearing

Participants were provided with a list of strategies that people usually used to increase the chance of conceiving (e.g., not smoking; not drinking alcohol; ovulation tests; seeking medical advice; having children earlier than planned). This list was developed by the authors based on the instrument Intentions to optimize fertility by Fulford et al. (2013). We retained the items regarding behaviors that have empirical evidence on affecting fertility, with good reliability ($\alpha = .80$). Participants were asked to rate the probability of engaging in each one of these strategies, on a scale ranging from 0 (not at all likely) to 5 (extremely likely). Since the postponement of childbearing to later ages is a risk factor for infertility and it might be the target fertility-protective behavior to prevent infertility, and in accordance with our study goal of understanding what may contribute to the decision to anticipate childbearing, we only used data regarding one of the strategies: "Indicate the likelihood that you would try to have children earlier than planned."

Perceived Threat of Infertility

This measure was defined by perceived severity of infertility ("Thinking that I might take more than 12 months to get pregnant concerns me") multiplied by perceived susceptibility to infertility ("What is your likelihood of taking more than 12 months to become pregnant?"). Items were rated from 1 (strongly/not all likely disagree) to 5 (strongly agree/extremely likely) and high scores indicated higher perceived threat of infertility. Perceived threat of infertility was composed of perceived susceptibility to infertility multiplied by perceived severity of infertility, as suggested by the HBM (Champion & Skinner, 2008; Hochbaum et al., 1952) and used in previous studies in the field of fertility (Boivin et al., 2018; Stern et al., 2013; ter Keurst, Boivin, & Gameiro, 2016).

Perceived Obstacles to Having the Number of Children the Participants' Desired

This measure was developed by Peterson et al. (2012) and asks participants to rate the importance of potential barriers they believe may prevent them from fulfilling their reproductive life plan within the desired time. It comprises six items: career aspirations, educational goals, personal interests, not

feeling emotionally prepared, financial concerns and infertility. Each item is answered in a scale ranging from 0 (it is not a barrier) to 5 (it is a strong barrier). These obstacles are conceptualized in this study as perceived barriers, following the HBM model. This instrument revealed acceptable internal consistency in this sample ($\alpha = .57$).

Behavioral Intention In Case of Infertility

This measure was developed by Lampic, Svanberg, Karlström, and Tydén (2006) and ask participants to rate the likelihood of undergoing fertility treatment, adopting a child/children, or choosing to stay childless (3 items) if they experienced difficulties conceiving in the future. Responses were given on a visual analogue scale (VAS), with extreme values being 0 (entirely unlikely) and 100 (highly likely). This instrument has been widely used in the field of literature on fertility and reproductive intentions (Abiodun, Alausa, & Olasehinde, 2016; Peterson et al., 2012) and presents good internal consistency in this sample ($\alpha = .82$). These items were used as facilitators, following the theoretical model of HBM, as these attitudes are expected to influence the reproductive choices.

Statistical Analyses

Analyses were conducted in SPSS 24. Descriptive statistics were performed to characterize the sample. Correlations were used to examine associations between study variables. The barriers and facilitators significantly associated with the outcome were entered in the mediation model (Von Ah et al., 2004). To test whether the effects of perceived threat of infertility on intention to anticipate childbearing were mediated by barriers and facilitators, simple mediation (model 4) was conducted using the PROCESS macro (version 3.00, Hayes, 2012) in SPSS (v.24). The model tested included one independent variable, four mediators, and one outcome variable. Perceived threat of infertility (susceptibility x severity) was the independent variable; two barriers to the achievement of the reproductive life plan (infertility, not being emotionally prepared) and two facilitators reflecting the behavior in case of infertility (willingness to use fertility treatments, staying childless) were the mediators; and intention to anticipate childbearing was the outcome variable (See Fig. 1). The sociodemographic and reproductive plan-related variables that were found to be significantly associated with the dependent variable were introduced as covariates. Indirect effects (i.e., indirect effect of perceived threat on intention to anticipate childbearing through each one of the four mediators) with bootstrap analysis (bias corrected) with 5000 samples and a 95% confidence interval estimate (CI) were used. When CI does not include zero, the effect is considered significant (Hayes, 2012). Finally, we compared the strength of the individual indirect effects (each mediator) using pairwise contrasts (Hayes, 2012). The empirical power tables proposed by Fritz and MacKinnon (2007) for mediation models showed that this study sample size was adequate to find mediation effects (for small to medium effects in path a and b with a power of .80).

Results

Sample

The sample was composed of 240 women (*M* age = 28.14; SD = 4.01). Most had a college degree (41.0%) or master's/doctorate degree (41.8%). The women were involved in a romantic relationship for a mean duration of 6.04 years (SD = 3.56) and 65% were living with their partner. Table 1 presents means and SD regarding reproductive life-plan variables. Participants desired to have two children. On average, the desired age for the first child was 30.45 years and for the last 34.45 years. Twenty-four percent were currently

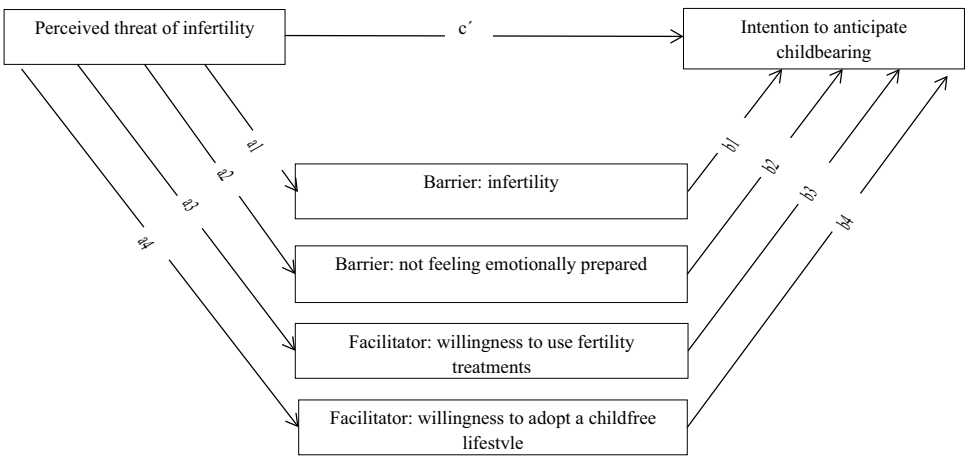

Fig. 1 Mediation model proposed. *Note* c´path, direct effect of perceived threat of infertility on the intention to anticipate childbearing; a1 path to a4 path, effect of perceived threat of infertility on each of the four mediators; b1 path to b4 path, effect of each mediator on the intention to anticipate childbearing

Table 1 Descriptive statistics on reproductive life-plan variables and study variables

	M	SD
Reproductive life-plan variables		
Nr of children desired	2.25	.65
Age at first child	30.45	4.44
Age at last child	34.45	4.50
Confidence about having the desired number of children in the desired time interval (range 1–5)	3.13	1.19
Intention to anticipate childbearing (range 1–5)	2.80	1.07
Susceptibility to infertility	2.86	.86
Severity of infertility	3.88	1.12
Barriers (range 1–5)		
Professional, career	3.33	1.46
Education	2.32	1.37
Personal interests	2.11	1.15
Financial concerns	3.59	1.19
Not feeling emotionally prepared	2.23	1.24
Infertility	2.50	1.36
Facilitators (range 0–100)		
Behavior in case of infertility: treatments	76.71	30.01
Behavior in case of infertility: adoption	62.75	31.34
Behavior in case of infertility: staying childless	25.35	31.29

trying to conceive. No differences were found in the reproductive plan variables between those who were already trying to conceive and those who were not (for the number of desired children and desired age at first and last child, data not shown). Participants were moderately to highly confident that they would be able to have the desired number of children within the desired time interval.

Intention to Anticipate Childbearing, Barriers, and Facilitators

Table 1 presents descriptive statistics for the study variables. The mean likelihood of using the strategy of trying to anticipate childbearing was 2.80 (SD = 1.07; possible range 1–5). Thirty-nine percent rated as not at all likely/low likelihood of trying to have children earlier than planned, 35.4% reported a moderated likelihood, and 25.1% reported a very/extremely likelihood to try to have children earlier than planned.

Regarding barriers to the achievement of reproductive life-plan, four barriers were rated by participants as moderate barriers: personal interests, not feeling emotionally prepared for childbearing, educational goals, and infertility whereas career aspirations and financial concerns were rated as stronger barriers (see Table 1). As for facilitators, measured as the likelihood of undergoing fertility treatments, adopt or staying childless, women reported, on average, a higher probability of undergoing fertility treatments than to pursue adoption, and they were less likely to accept staying childless in case of an infertility diagnosis.

Testing Associations Between Study Variables

Table 2 presents the correlations between study variables. Higher perceived susceptibility to infertility was correlated with higher willingness to stay childless in case of infertility ($r = .127$, $p = .049$). Furthermore, higher perceived severity of infertility was correlated with higher perception of infertility as a barrier ($r = .315$, $p = < .001$) and willingness to use fertility treatments in case of infertility ($r = .331$, $p < .001$), as well as lower perception of personal interests as a barrier ($r = -.165$, $p = .011$). Severity ($r = .248$, $p = < .001$), willingness to use fertility treatments in case of infertility ($r = .188$, $p = .003$), and perception of infertility as barrier ($r = .247$, $p = < .001$) were found to be correlated with higher intentions to have children earlier, whereas willingness to stay childless in case of infertility ($r = -.141$, $p = .029$) and the perception of not feeling emotionally prepared ($r = -.146$, $p = .024$) were correlated with lower intentions to have children earlier.

Being actively trying to conceive, as well as the number of desired children, was correlated with higher intention to anticipate childbearing and were consistently associated with the majority of proposed mediators. For this reason, these two variables were further introduced in the model as covariates.

Testing the Mediational Model

Table 3 presents the results for the mediation model, controlling for being actively trying to conceive and the desired number of children. The total effect was significant (effect = .04; 95% CI [.008, .062]), but no significant direct effect of the perceived threat of infertility on intention to anticipate childbearing was found when the mediators were included (effect = .02; 95% CI [− .013, .044]), indicating full mediation. Bootstrap confidence intervals confirmed the indirect effect of perceived threat of infertility on intention to anticipate childbearing, both through the perception of infertility as a strong barrier (effect = .01; 95% CI [.005, .027]) and through the willingness to use fertility treatments in case of infertility (effect = .01; 95% CI [.008, .016]). No significant indirect effects were found through the willingness to stay childless and the perception of not feeling emotionally prepared. The model predicting intention to anticipate childbearing was significant ($F_{7, 232} = 8.13$, $p < .001$) and explained 20% of the variance in intention. Pairwise contrast analyses showed no differences in the strength of both significant indirect effects (effect = .01; 95% CI [− .006, .022]).

Table 2 Correlations between study variables

Study variables	1	2	3	4	5	6	7	8	9	10
Sociodemographic covariates										
1. Female age	–									
2. Relationship length	.234**	–								
3. Education	.273**	. 177**	–							
Reproductive plan covariates										
4. Actively trying to conceive	.245**	.166*	− .089	–						
5. Desired number of children	− .116	− .019	.006	− .079	–					
6. Desired age at first child	.572**	.084	.208**	.010	− .136**	–				
7. Desired age at last child	.410**	.045	.146*	.014	.247**	.828**	–			
Study variables										
8. Susceptibility to infertility	.139*	− .003	.037	.078	− .073	.088	.037	–		
9. Severity of infertility	.033	.064	.033	.139*	.093	.048	.105	.013	–	
10. Facilitator: Behavior in case of infertility; treatments	− .135*	.046	.035	− .140*	.128*	.044	.072	− .049	.331**	–
11. Facilitator: Behavior in case of infertility; adoption	− .073*	.− .021	.114	− .143*	.180**	.013	.068	.020	− .001	.154*
12. Facilitator: Behavior in case of infertility; staying childless	.154*	.147*	.011	− .011	− .168**	− .024	− .115	.127*	− .051	− .295**
13. Barriers: professional, career	− .028	− .019	.159*	− .343**	.036	.081	.054	.046	.012	.142*
14. Barriers: education	.012	− .038	.129	− .165*	.038	.154*	.131*	.069	.041	.072
15. Barriers: personal interests	.039	.072	− .035	− .138*	− .071	− .015	− .097	.002	− .165*	− .123
16. Barriers: financial concerns	− .057	− .033	− .028	− .210**	.112	− .019	.029	.046	.053	.058
17. Barriers: not feeling emotionally prepared	− .029	− .027	.057	− .144**	− .058	.107	.066	− .017	− .001	− .047
18. Barriers: infertility	.134*	.094	.126	.112	.028	.145*	.130*	.155*	.315**	.128*
19. Intention to anticipate childbearing	.110	.120	− .035	.251**	.168**	.037	.088	− .003	.248**	.188**

Study variables	11	12	13	14	15	16	17	18	19
11. Facilitator: Behavior in case of infertility; adoption	–								
12. Facilitator: Behavior in case of infertility; staying childless	− .381**	–							
13. Barriers: professional, career	.075	.047	–						
14. Barriers: education	.050	.057	.548**	–					
15. Barriers: personal interests	− .099	.186**	.232**	.280**	–				
16. Barriers: financial concerns	.083	− .019	.229**	.108	.255**	–			
17. Barriers: not feeling emotionally prepared	− .182**	.260**	.072	.105	.464**	− .149*	–		
18. Barriers: infertility	− .014	.025	− .059	.040	− .051	.079	.175**	–	
19. Intention to anticipate childbearing	.005	− .141*	− .054	− .032	− .071	− .026	− .146*	.247**	–

*$p < .05$; **$p < .01$

Table 3 Total, direct, and indirect effects of perceived threat on intention to anticipate childbearing ($N = 240$)

	Coeff	SE	*t*	*p*	LLCI	ULCI
Effect of perceived threat on M1 (a1 path)	.09	.02	5.40	<.001	.060	.129
Effect of perceived threat on M2 (a2 path)	.01	.02	.50	.62	− .025	.042
Effect of perceived threat on M3 (a3 path)	1.34	.40	3.38	.001	.559	2.120
Effect of perceived threat on M4 (a4 path)	.42	.42	1.00	.32	− .411	1.256
Effect of M1 on intention (b1)	.16	.05	3.06	.003	.055	.255
Effect of M2 on intention (b2)	− .10	.05	− 1.91	.057	− .211	.0032
Effect of M3 on intention (b3)	.01	.00	2.22	.027	.001	.010
Effect of M4 on intention (b4)	− .00	.00	− .76	.449	− .006	.003
Total effect of perceived threat on intention (c path)	.04	.01	2.58	.010	.008	.062
Direct effect of perceived threat on intention (c´path)	.02	.01	1.09	.277	− .013	.044

	Effect	Boo SE	Boo 95% LLCI	Boo 95% ULCI
Indirect effect of perceived threat on intention through M1	.01	.01	.005	.027
Indirect effect of perceived threat on intention through M2	− .00	.00	− .006	.003
Indirect effect of perceived threat on intention through M3	.01	.00	.001	.016
Indirect effect of perceived threat on intention through M4	− .00	.00	− .004	.003
R^2=20%				

Coeff coefficient, *SE* standard error, *LLCI* lower level of 95% confidence intervals, *ULCL* upper level of the 95% confidence intervals, *Boo* Bootstrap results, *M1* infertility (barrier), *M2* not feeling emotionally prepared (barrier), *M3* willingness to use fertility treatment in case of infertility (facilitator), *M4* willingness to staying childless in case of infertility (facilitator)

Discussion

This study aimed to explore the association between perceived threat of infertility and intention to anticipate childbearing, by examining barriers and facilitators to achieving reproductive goals as potential mediators of this relationship. To the best of our knowledge, this is the first study exploring the role of barriers in childbearing intentions. As hypothesized, perceived threat of infertility was associated with higher intention to have children earlier than planned, with the perception of infertility as a strong barrier, as well as the willingness to undergo fertility treatments in case of no success in conceiving. Our results are in line with what is conceptualized by the HBM, showing that perceived threat (susceptibility and severity) has an important role in intentions (and future behaviors) (Champion & Skinner, 2008; Hochbaum et al., 1952). This result is also consistent with others in the field of fertility (Fulford et al., 2013; Stern et al., 2013), indicating that higher perceived threat of infertility is related to higher intentions to adopt fertility-optimizing behaviors. In addition, our results suggest that barriers and facilitators play a role in the undertaking of health behaviors, as conceptualized by the HBM (Hochbaum et al., 1952) and consistent with existent literature in other health contexts, such as in oral self-care behaviors (Buglar et al., 2010), colorectal cancer screening (McQueen et al., 2010), and healthy eating (Deshpande, Basil, & Basil, 2009).

This study adds to previous research by examining the mechanisms through which the perceived threat of infertility may influence the intention to anticipate childbearing. First, correlations showed that only two barriers were associated with intention to have children earlier than planned: perceiving infertility as a strong barrier to achieving reproductive goals and not feeling emotionally prepared to have children. Although literature has indicated that financial instability, career, and professional barriers are frequently associated with postponing childbearing (Berrington & Pattaro, 2014; Cooke, Mills, & Lavender, 2012; Fahlén, 2013; Kalebic, 2011; Martin, 2000; Mills et al., 2011), our results suggested that other reasons may also play a role in the intention to anticipate childbearing. However, when indirect effects were tested, only the perception of infertility as a strong barrier to achieve the reproductive plan was a significant mediator. This result suggests that perceiving infertility as a strong barrier to achieving their personal reproductive goals, more than simply feeling susceptible and recognizing infertility as a severe disease, may play an important role here. Women's awareness that infertility can hinder them from achieving their reproductive goals may increase their likelihood of trying to have children earlier. In addition, not feeling emotionally prepared to have a child does not seem to mediate the relationship between perceived threat of infertility and intention to anticipate childbearing. It might be that people who perceived infertility as a threat might "buffer" or reduced importance to the feeling of not being emotionally prepared to have children.

Regarding the facilitators, only willingness to undergo fertility treatments and willingness to stay childless were

significantly associated with the intention to anticipate childbearing (positively and negatively, respectively). When we tested for the indirect effect, only willingness to undergo treatments was a significant mediator. This result was surprising, since studies have shown that young people believe fertility treatments can overcome the effect of age on fertility (Pedro et al., 2018). On the other hand, when women feel threatened, they may be more open to undergoing fertility treatments, which, in turn, seems to result in higher intention to anticipate childbearing. Higher willingness to undergo treatments may result in higher intention to anticipate childbearing, as a way to avoid fertility problems and fertility treatments. Willingness to stay childless was expected to be a mediator in a negative way. However, because our sample was too young and without fertility problems, the scenario of not being able to have children definitively might be a very unlikely and remote scenario.

Some limitations should be acknowledged. First, the cross-sectional design compromises the establishment of causal inferences, although the directional paths tested were theoretical and empirically based. Future studies should explore and establish longitudinal associations between variables that allow causal inference. Second, the self-selected and convenience nature of our sample, due to recruitment in several settings, does not allow calculating the response rate. In addition, the participants who responded may have been those for whom childbearing was more important, and who were more interested in, or aware of, fertility and childbearing-related issues. In this sense, results should be interpreted with caution. Third, our study focused on women who are highly educated. Future studies should also explore the perspective of men and preferably in a dyadic way, including participants with different educational levels. Lastly, we only evaluated participants' intentions; although intentions have been used to predict a diversity of health behaviors (Sheeran, 2002), some evidence has suggested a possible gap between intentions and behaviors (Sniehotta, Scholz, & Schwarzer, 2005). However, we evaluated the expectation ("Indicate the likelihood that you would try to have children earlier than planned?"), which seems to have a higher predictive validity compared to intentions ("I intend") (Sheeran, 2002).

Despite these limitations, our results support the recent calls to develop and disseminate information about fertility (Harper et al., 2017). In this study, participants desired, on average, two children; according to a computer-simulation study, people who desire a two-children family "should" start trying to conceive at a female age of 31 years old or less (or 34 if they are willing to consider the use of fertility treatments), if they desire to have a 90% chance of success (Habbema, Eijkemans, Leridon, & Te Velde, 2015). Even though the participants of our study were very open to the use of fertility treatments, only a small percentage was actively trying to conceive (24%), meaning that a significant proportion may be at risk of not achieving the desired family size. This may serve as a reflection, since our study showed that women who perceive themselves at risk (perceived threat) of having fertility problems will perceive, to a higher degree, infertility as a strong barrier (barrier to achieving reproductive goals) or will report more willingness to use fertility treatments (facilitator to achieving reproductive goals) which, in turn, would increase intentions to anticipate childbearing. Since the model showed full mediation, this means that the relationship between perceived threat of infertility and intention to anticipate childbearing only occurs via infertility as a barrier and willingness to use fertility treatments as a facilitator, that is, the relationship between perceived threat of infertility and intention to anticipate childbearing is full explain by these mediators. These results support the importance of empowering people to know more about infertility risks factors, treatment options, and success rates. Therefore, these specific contents should be addressed in education programs. Helping people to recognize that infertility is a real possibility may contribute to changes in childbearing intentions; it may be useful to educate people that infertility affects both men and women at young ages, both from developing and developed countries. Moreover, clarifying some myths regarding treatments may influence their willingness to use fertility treatment if needed, since people have doubts about its safety and side-effects (Klonoff-Cohen & Natarajan, 2004), as well as religious and cultural beliefs (Dyer, 2008), which may dissuade them from seeking medical help (Bunting & Boivin, 2007). Additionally, future interventions should explore the efficacy of raising awareness about fertility treatments and discussing individual risks for infertility (for example, using a tool of individual risk factor; FERTISTAT (Bunting & Boivin, 2010)). Education about fertility and infertility treatments should be delivered not only to patients, but also to healthcare providers (midwife, nursing, and medical students), who also present a lack of knowledge regarding age-related fertility decline (Chelli, Riquet, Perrin, & Courbiere, 2015; Fotopoulou, Chasiakou, Gryparis, & Baka, 2015; García, Vassena, Prat, & Vernaeve, 2017; Hammarberg, 2016; Mogilevkina, Stern, Melnik, Getsko, & Tydén, 2016; Mortensen, Hegaard, Andersen, & Bentzen, 2012; Yu, Peterson, Inhorn, Boehm, & Patrizio, 2016), given the role these professionals may play in preventive behaviors and empowering conscious decision-making according to individuals' reproductive goals. Moreover, interventions should also contemplate other options regarding the reproductive plan, such as choosing not to have children or choosing adoption, and avoid content with implicit social norms (e.g., regarding the number of children people should have for generational renovation), since there are reports of negative reactions (Pedro et al., 2018) and increased anxiety (Maeda et al., 2016).

In conclusion, this study indicated that women who perceive themselves at risk (perceived threat) of having fertility problems only intend to anticipate childbearing via perceiving infertility as a strong barrier to achieving their reproductive goals or if they report willingness to use fertility treatments. Knowledge about the specific barriers and facilitators as potential mechanisms linking perceived threat of infertility to the intention to anticipate childbearing may help to improve education on fertility and reproductive health.

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Compliance with Ethical Standards

Conflict of interest Juliana Pedro, Tânia Brandão, Joana Fernandes, Alberto Barros, Pedro Xavier, Lone Schmidt, Maria E. Costa, and Mariana V. Martins declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals, performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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