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## SPECIALTY SECTION

This article was submitted to Politics of Technology, a section of the journal Frontiers in Political Science

RECEIVED 25 August 2022

ACCEPTED 24 November 2022

PUBLISHED 14 December 2022

## CITATION

Aurrekoetxea-Casaus M, Ronda L and Govillard L (2022) Gender differences in attitudes toward assisted reproduction in the Spanish population: The weight of religiosity and conservatism. *Front. Polit. Sci.* 4:1027997. doi: 10.3389/fpos.2022.1027997

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# Gender differences in attitudes toward assisted reproduction in the Spanish population: The weight of religiosity and conservatism

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**Introduction:** The continuous increase in assisted reproductive treatments (ARTs) has generated different ethical dilemmas in the scientific and academic debate. However, there are a few occasions when Spanish citizenship pronounces itself on this issue. It seems that the population has assumed ARTs without questioning despite being a subject crossed by gender mandates that make women the center of ART application. This study delves into the attitudes of the Spanish population toward assisted reproduction and the persistence of gender mandates in the choice of ARTs, beyond the apparent (almost fixed image of the) total acceptance of ARTs.

**Methods:** A questionnaire was applied to a sample of 1,030 randomly selected people. Variables included attitudes toward the different possibilities of assisted reproduction, different approaches depending on whether infertility or sterility fell on the woman or the man and other scenarios related to genetic dilemmas.

**Results:** The mean difference test confirmed the high acceptance of ARTs by the Spanish population and revealed significant gender differences. Women accepted ARTs for infertility and genetic disorders, while men accepted ARTs for choosing a baby's sex. However, gender was not the only relevant variable in the conducted linear regression model; religiosity and political conservatism were also explanatory variables for the acceptance of ARTs.

**Contribution:** This study is a clear contribution to the debate on the impact of "medicalization" on women regarding assisted reproduction, showing the persistence of motherhood as a gender mandate.

## KEYWORDS

assisted reproduction, gender, inequality, linear regression, ethical dilemmas

## Introduction

Assisted reproductive treatments (ARTs) have increased to such an extent that by 2100, 167 million people will have been born from assisted reproductive technologies (United Nations, 2015; Faddy et al., 2018).

TABLE 1 Assisted reproductive techniques registered in Spain (2015–2019).

Variable	<i>In vitro</i> fertilization		Artificial insemination	
	Women	Live births	Women	Live births
2019	38,509	6,476	32,568	3,876
2018	40,807	7,368	34,100	4,020
2017	42,498	8,211	34,964	4,037
2016	45,160	9,355	36,463	4,318
2015	44,477	10,099	38,903	4,460

In Spain, assisted reproduction methods have had wide diffusions, as one of the European countries with the highest number of treatments (Enguer Gonsálbez and Ramón Fernández, 2018). Between 2015 and 2019, the Spanish Fertility Society registry that collects reports on assisted reproductive treatments registered a total of 211,451 women in high-complexity treatments (*in vitro* fertilization, oocyte donation, cryo transfers, preimplantation genetic diagnosis, oocyte freezing, and *in vitro* maturation); and 176,998 women in low-complexity treatments such as artificial insemination with partner sperm or from an anonymous donor (Sociedad Española de Fertilidad, 2015–2019; see Table 1).

These data reflect that women carry the weight of the treatments, being the main focus of causes and solutions regarding fertility problems, and they are the main subjects of ARTs. In this sense, Skedgel et al. (2021) observed a consensus of support for ARTs in various countries (United States, United Kingdom, Spain, Sweden, Norway, Finland, Denmark, and China) on medical grounds.

In a different sense, Bennett and de Kok (2018) highlight reproductive desire in woman, which, like any other desire, is “a deeply personal and fundamentally socially structured emotion.” Thus, the consensus is that infertility or poor ovarian function is a medical condition, while the desire to have children is a basic human need and a right. Therefore, the opportunity to have children should be available to everyone. Infertile people should have access to treatments that increase their chances of pregnancy.

However, the consensus and support for ARTs vary due to social reasons. For example, using sperm, oocytes or uterus of third parties in ARTs (Yamamoto et al., 2018) or selecting disease-free embryos, preimplantation genetic diagnosis, choice of sex, or different family models (Enguer Gonsálbez and Ramón Fernández, 2018).

The variability of support for ARTs based on social variables, such as gender, age, and educational level, has been investigated in different countries, revealing the influence of cultural, social, and religious norms in supporting ARTs. Studies, such as Fauser et al. (2019) investigation in six European countries,

or Szalma and Djundeva (2019), are evidence that women are more likely than men, to have favorable attitudes toward assisted reproduction and, consequently, more significant support for these techniques. These differences could happen because motherhood is more important for women than fatherhood for men in most European countries, with ART support constituting a path toward fulfilling a gender mandate: to become mothers (Wennberg et al., 2016).

Despite the high level of consensus that ARTs arouse, as reflected in these studies, there are latent discrepant attitudes under which different assumptions are made about the treatments to be chosen. Probably, the consensus presented by the reviewed studies would have been otherwise if questions regarding the different assumptions given before the selection of ARTs had been asked, as pointed out by Szalma and Djundeva (2019).

Therefore, this study aims to deepen the study of attitudes toward assisted reproductive treatments, not as a general question, but by differentiating between the different assumptions presented and, at the same time, discerning whether women show more significant support for the use of these techniques. These are the questions this paper aims to resolve: Are there differences between women and men concerning their different assumptions regarding the application of assisted reproductive treatments? Is gender a key variable in understanding the social agreement around ARTs? What other variables can help in understanding this high consensus?

Understanding the different positions requires understanding the context in which ARTs are offered as an alternative to subfertility, which requires delving into the different assumptions surrounding the other treatments. The following scenarios are considered: (1) a couple in which the woman does not get pregnant; (2) a couple in which the man is infertile and resorts to insemination with donated sperm; (3) a couple in which the woman is infertile and resorts to insemination with her partner's sperm; (4) there is a high risk of a genetic defect; and (5) the couple would like to choose the sex of their baby.

The results of this study are intended to benefit both academic research and public policies from a gender perspective, addressing in depth the social aspects of ARTs and the attitudes of the population toward the different nuances and assumptions of ARTs, for its regulation, availability, and use from a gender perspective, especially when the primary recipients of such treatments are women. It cannot be forgotten that the acceptance of ARTs without nuances can affect the demand for and supply of ARTs (Ziebe and Devroey, 2008).

From the perspective of academic research, this study develops a questionnaire contemplating attitudes relating to the different scenarios of assisted reproduction, which is an essential contribution to the measurement of values in sensitive issues, such as the treatment of subfertility. Using fieldwork it also tests a new set of indicators that contributes greatly to the knowledge

of the value changes experienced by Spanish society. From a methodological perspective, this study can be of great use in European countries.

## Theoretical background

### Conflicting positions in assisted reproductive treatments

The consensus on access to and use of ARTs does not prevent a parallel debate between academics and scientists on commercialization and freedom of decision or simply assuming ARTs as just another technological advancement.

Assisted reproduction treatments (ARTs) and motherhood are two sides of the same coin. The desire for motherhood appears unquestionable in the majority of women that there seems to be no concrete answers to the reasons for materializing this “diffuse, non-objectified desire, linked to certain values and social imaginary, into a concrete desire focused on an individualized and proper daughter or son” (Viera Cherro, 2012). However, the selected words of this author mark the origin of such a desire. The sociocultural pressure for the realization of motherhood and the fact of being socialized in a context that orients women to feel that their fulfillment goes through the performance of motherhood, therefore, is motherhood an own desire or an alien-appropriate desire? It is true that social changes toward more participatory roles of men in the upbringing of children, the presence of women who decide not to be mothers, the possibility of adoption and new family models are establishing new nuances in the desire to be mothers. However, beyond such changes, women still have the leading role in reproduction and what this entails; Thus, ARTs have made it possible to approach and fulfill this desire, marked as a social imperative.

The rise of ARTs, anthropology, social studies, and feminism raised voices that called for reflection and debate. From the activism of the FINRRAGE movement (FINRRAGE, 1989) and feminism, there was a rejection of new treatments, but there also emerged positions with a specific moderation toward ARTs. The debates then show a first antagonism (Johnson, 2020) so that for some radical feminists, ARTs were identified as one more form of patriarchal oppression of women’s bodies, while other positions proposed different ways of appropriation and resistance and even considered ARTs as a platform for utopian liberation. This author situates the debate on whether reproductive technology constitutes a form of patriarchal oppression or can be regarded as a source of freedom for women in their reproductive rights.

The positions or arguments for or against assisted reproductive treatments are not as simple as one might imagine at first glance. From positions of outright rejection of ARTs, both anti-ART feminists and ecofeminists see ARTs as “inherently patriarchal instruments used by men to subjugate

women.” Likewise, Chodorow (1978) pointed to motherhood as patriarchal oppression and the need to rupture this natural conception of motherhood as a destiny for women in society. They deconstruct the concept of maternal instinct, as De Beauvoir (1949) would say. In the hands of gynecology and obstetrics, the female body becomes raw material for the technological production of human beings, research, and experimentation. Crowe (1985) shows ARTs as the best alternative, reinforcing the idea of biological motherhood as a desirable model instead of delving into the causes that lead to this decision. The idea of motherhood as a central element of female identity makes the possibility of opting for ARTs a forced choice, and behind this idea of motherhood is the idea of a “good mother as good reproducer” (Marti Gual, 2011). For authors such as Schenker and Eisenber (1997), ARTs are situated in a patriarchal society in which science and technology are in the male hands, making women bear most of the burden of reproductive health. Likewise, Pollack Petchesky (1990) postulated that differential access to technology between women and men, determined by different structural positions, caused women to make their reproductive decisions, but that “they do not do so at will.”

In this sense, current studies on the wellbeing of couples who undergo ARTs for infertility show significant gender differences. Thus, highlighting that in the face of these treatments, women present higher levels of depression, anxiety, and impotence. They present a lower feeling of acceptance compared to men, although men also present impotence and anxiety, depending on the diagnosis of infertility. In situations of low social support, women present more depression and men present more anxiety. In conclusion, gender differences and ARTs can influence both partners and the adjustment of a couple’s relationship (Molgora et al., 2020).

In opposition to these positions of frontal rejection, there are other voices even from radical feminism, such as that of Firestone (1970), who pointed out that although motherhood was a victimizing experience for women, technology could contribute to eliminating sexual differences as the origin of oppression. Similar positions are held by Haraway (1995), who, in her *Manifesto for Cyborgs*, saw technology as a tool for liberation.

ART supporters argue that these treatments promote individual rights, reproductive freedom, and choice. Therefore, if women have the right to choose not to become mothers or avoid pregnancy, they also have the right to become mothers using technology’s resources. In addition, ARTs increase the options of having children outside marriage or heterosexual partnerships so that women without a partner and/or lesbians can exercise their conception of family or motherhood. Thus, ARTs are a mechanism for subverting the patriarchal social order. At the same time, voices emerge that the feminist movement has neglected the pain and suffering of infertile women (Kimball, 2019; Takhar, 2022).

## Attitudes, variables, and assisted reproduction

In addition to the debate among social scientists and academics, studies on attitudes toward ARTs have tried to show the different stances of citizens toward such treatments and what may be the variables underpinning possible differences between women and men and among other social groups, but fail to establish what may be the determinants of these different stances.

In a study conducted in Japan by Yamamoto et al. (2018), attitudes toward ARTs were affected by gender, age, and experience of infertility. There was no effect on marital status, number of children, or annual family income. These results are essential for understanding attitudes toward third-party reproduction.

For their part, Dempsey and Critchley (2010) in Australia and Herrera et al. (2015) in Chile concluded that the group showing the highest acceptance of ARTs was mainly composed of women, college-educated, young, and not very religious. In the more recent groups, there were older and more religious people. This last study was carried out with a sample of 1,500 people from Santiago, Chile, and concluded that behind the majority of support for the use of IVF (71.8%), there was ambivalence. Those favoring IVF without any restrictions (24.1%) were young, non-religious and of medium-high socioeconomic level. Those who show some restraint (35.2%) are women of childbearing age with heterosexual partners and a medium-high socioeconomic class. They argued that ARTs should only be for a traditional heterosexual family model, as opposed to other types of families, such as single-parent and homo-parental.

Similarly, Chambers et al. (2009), Bote and Martínez-Martínez (2019), and Lazzari (2022) found that delayed motherhood, childlessness or low fertility drive a social pattern. This pattern could be related to younger people, with higher academic qualifications, unmarried, with greater acceptance of ARTs, resulting in the case of women, more clearly that delayed motherhood and childlessness is related to having higher education.

These authors highlight the need to implement reconciliation policies that do not place women in the position of choosing between their academic-professional careers and motherhood and employment policies that reduce precariousness and youth unemployment and avoid postponing the decision to have children. This would reduce the use of ARTs and public and private spending on them.

For Fauser et al. (2019), young people and women are the groups most interested in fertility issues; specifically, women are more likely to expand the age limits of access to ARTs and high-income earners (Bennett and de Kok, 2018) who perceive ARTs as a path to rational and planned reproductive choices.

Other authors were interested in variables, such as the influence of religiosity on greater or lesser support for ARTs. Specifically, Herrera et al. (2015) demonstrated the correlation between religiosity and lower support for ARTs. Likewise, Chan and Mehta (2022) evaluated 8,107 people in the USA and showed that higher religiosity was associated with a higher likelihood of considering these technologies as morally wrong. Although they often could not articulate the reason, Ecklund et al. (2017) found that more traditional branches of religious traditions—Orthodox Jews, Muslims, and Evangelical Christians—were prone to being wary of usurping God's role as a creator when discussing ARTs. Therefore, moral attitudes vary by religious tradition, with some religious groups being more likely to view these technologies as amoral.

In the context of religion and the use of ARTs, there are also discrepancies. In this sense, authors such as Swidler (1986) and Dillon (2001), from a northamerican context, show that some religious women, in an exercise of “interpretative autonomy” or “cultural toolkit,” adapt the religious doctrine to their personal needs and contexts. These women show greater acceptance and use of ARTs even though their religious doctrine rejects them. Evidently, Zareba et al. (2020) survey, demonstrated that Polish women agreed with the use of ARTs and even abortion in clear discrepancy with their declared religiosity. Some authors specifically consider online fertility education as an effective tool for belief changes and acceptance of ARTs (Daniluk and Koert, 2015).

When understanding the greater or lesser positive attitude toward ARTs, a significant relationship is found between religion and political ideology. Specifically, religiosity and conservative right-wing ideology are related to lower acceptance of ARTs (Herrera et al., 2015; Irrázabal and Johnson, 2019). In this collective, they generate feelings of guilt, anguish, social isolation, rejection of ARTs, and social stigmatization of ART users, concluding that throughout the ART process, religion, and spirituality should be included as support for people who identify as such (Gezinski et al., 2021).

Finally, the meta-analysis by Hammarberg et al. (2017) concerning relational variables is worth mentioning. The researchers concluded that scholarship on motherhood focuses almost exclusively on women and that infertility is the result of delayed childbearing because of pursuing an academic career and traveling. However, the evidence indicates that the lack of a partner or having a partner unwilling to commit to parenthood is the main reason for the delay and use of ARTs.

From the theoretical framework presented, the following hypotheses were deduced and contrasted:

- H1. There are gender differences in the acceptance of the use of ARTs.
- H2. Religiosity is an explanatory variable for the acceptance of using ARTs; the more significant the individual's religiosity, the lower their approval of using ARTs.

H3. Political conservatism is an explanatory variable for the acceptance of using ARTs; the more conservative the individual, the less accepting they are of using ARTs.

H4. Educational level is an explanatory variable for the acceptance of ARTs; the higher the educational level of the individual, the greater their acceptance of ARTs.

H5. Having children is an explanatory variable for the acceptance of using ART.

H6. The socioeconomic level is an explanatory variable for the acceptance of using ART.

## Materials and methods

This study is part of a larger project whose main objective is to analyse the attitudes and values of Spanish citizens in the areas of the beginning and end of life in the context of enormous and rapid technological, scientific, and medical advances.

The access, increased availability, and expected benefits of such development may impact citizens' profound moral and value orientations in dealing with essential aspects of human existence, such as life and death. These improvements are intended to facilitate reproduction and enable delayed childbearing in a social context where career perspectives and gender roles are highly salient as well as other attitudinal and value orientations.

## Questionnaire design

The main dependent variables will be justifications for using ARTs. The measurement of attitudes toward assisted reproductive treatments has been inspired by different modules of surveys, including neutral descriptions of different situations in the wording of the questions. Questions should avoid any technical terms that could cause misunderstanding or bias.

As for the independent variables, a selection and combination of the most relevant questions from the comparative surveys will be carried out, and new variables and questions from our design will also be added on those key dimensions indicated in the theoretical part, such as individualistic religiosity and religious socialization and gender role egalitarianism and gender familism.

## Sample

The data for conducting this study were collected using a questionnaire distributed to 1,030 participants in Spain. The sampling procedure was through an online questionnaire from a panel in the Internet community. Based on INE (Spanish Statistics Institute), cross-quotas were established by sex, age, and educational level, with 51.7% women and 48.3% men.

With respect to life, questions on attitudes toward technologies that make possible the conception of a new life were proposed in three sections: (1) a set of questions regarding the respondents' acceptance attitudes toward assisted reproduction treatments (ARTs) and the use of ART in a series of scenarios, (2) a set of questions regarding the respondent's religious and political orientation, and (3) a set of demographic questions covering age, gender, marital status, parenthood, educational level, salary range, religion, and political orientation. A total of 1,030 valid responses were gathered. The descriptive statistics of the sample are shown in Table 2. Women represented half of the sample (51.7%) and the majority of the respondents were between 18 and 54 years old (60.2%). Half of the respondents were married or in a common-law partnership (57.8%) and 61.6% of them have children. In terms of religion, Catholicism (53.0%) is hegemonic, although 43.1% of the sample expressed having no religious beliefs. Finally, 66.2% of the respondents completed secondary education and half of them earned over 1,400 euros per month.

## Study protocol

Each participant was informed of the purpose of the project and the instructions needed to answer the questionnaire. Participation was voluntary and participants could stop participating at any time. Only fully completed surveys were collected and analyzed, which helped to avoid data elimination.

## Ethical considerations

The project was approved by the Research Ethics Committee of the University of Deusto. This study is classified as risk-free research because no intervention or intentional modification of the biological, physiological, psychological, or social variables of the individuals participating in the study will be performed, nor will sensitive aspects of their behavior be treated.

## Results

### Justification of assisted reproduction by sexual identity (gender)

The first objective of this study is to analyse gender differences (women and men) in the justification and acceptance of ARTs. In the general sample, 86% were in favor of assisted reproduction (see Table 3, headers 6–10), and only 3.8% were against it (see Table 3, headers 1–4). In particular, 3.2% of women and 4.4% of men stated that they are against assisted reproduction. These results are in line with similar studies carried out in the European context, so it could be affirmed that



TABLE 2 Descriptive statistics for control variables,  $n = 1,030$ .

Category	Frequency	Percentage
<b>Gender</b>		
Male	498	48.3
Female	532	51.7
<b>Age</b>		
18–24	89	8.6
25–34	140	13.6
35–44	186	18.1
45–54	205	19.9
55–64	176	17.1
<b>Marital status</b>		
Married	493	48.08
Common-law partnership	91	9.0
Widow	56	5.5
Divorced	77	7.6
Separated	33	3.3
Never married	260	25.7
<b>Children</b>		
Yes	634	61.6
No	396	34.4
<b>Religion</b>		
Catholic	513	53.0
Protestant	7	0.7
Orthodox	6	0.6
Islam	4	0.4
Other	21	2.2
None	417	43.1
<b>Education</b>		
Less than primary	49	4.8
Primary	109	10.6
Half secondary	293	28.4
Full secondary	231	22.4
College	348	33.8
<b>Monthly salary</b>		
<750€	123	15.2
750€–950€	72	8.9
959€–1,200€	121	14.9
1,200€–1,400€	94	11.6
1,400€–1,700€	95	11.7
1,700€–2,100€	88	10.9
2,100€–2,300€	54	6.7
2,300€–2,750€	52	6.4
2,750€–3,550€	61	7.5

assisted reproductive treatments are practically unquestioned in the Spanish case. It is interesting to address whether the positions vary when the different assumptions for assisted reproduction treatments are presented.

When gender differences were analyzed (see Table 4), all statistical analyses were carried out using SPSS version 26.0. Before conducting the hypothesis tests, a Kolmogorov–Smirnov test was conducted to check the normality of the data. Significance levels for all studied variables were under 0.05, revealing non-normal distributions. Therefore, the non-parametric Mann–Whitney  $U$ -test was run to compare men's and women's acceptance of assisted reproduction techniques (ARTs) in different scenarios. Table 4 shows the Mann–Whitney  $U$ -test results, revealing existing differences. Table 4 also shows that H1 is supported. Women's overall acceptance of the use of ARTs is significantly higher than men's. In particular, women are more inclined to accepting: (1) artificial insemination and *in vitro* fertilization in general (MARTss = 8.91); (2) lab fertilization for couples who want to have a child but the woman does not get pregnant (MNo\_pregnancy = 9.30); (3) lab fertilization for couples where the man is infertile (MMale\_infertile = 9.01); (4) lab fertilization for couples where the woman is infertile (MFemale\_infertile = 9.02); and (5) lab fertilization for couples with a high risk of transmitting a genetic defect (MGenetic\_defect = 8.64). Additionally, women think it is essential to socially discuss ARTs to a greater extent than men (MDiscussion = 7.52). Conversely, men are more inclined to accept using ARTs among couples who want to choose the sex of their child (Msex = 5.15).

## Tested model for acceptance of ARTs

The second objective of this paper is to reveal whether an individual's gender is a predictor of their acceptance rate for using ARTs. Given the nature of the dependent variables, linear regressions were estimated for all dependent variables. The first linear model regresses the acceptance of ARTs on the dependent and control variables. Therefore, the dependent variables in the study measured the degree to which respondents supported using ARTs and using ARTs in five contexts of infertility or genetic selection. In particular, respondents showed their levels of acceptance of ARTs using a ten-point Likert scale, where 1 is *not acceptable in any case* and 10 is *acceptable in any case* (see Table 5).

As the literature suggests, the independent variables in this study were gender, religiosity and the conservative political orientation of individuals (see Table 2). Finally, a set of control variables was included in the study, as the literature suggests, they might also be predictors of the acceptance of ARTs. These are age, education, income, and whether the respondent has children.

To conclude, the demographic variables in Table 1 are included as control variables in the model (age, educational level, monthly salary, and whether the respondent has children or not), as the literature also suggests, they could be further predictors of the acceptance of ARTs. The correlation

TABLE 3 Justification for assisted reproduction by gender, scale 1–10 (%).

	1	2	3	4	5	6	7	8	9	10
	The use of ARTs can never be justified									The use of ARTs can always be justified
Sample	1.8	0.4	0.7	0.9	6.5	4.0	5.6	10.5	12.0	53.9
Male	2.6	0.4	0.6	0.8	9.8	4.8	6.0	8.8	12.2	49.4
Female	1.1	0.4	0.8	0.9	3.4	3.2	5.3	12.0	11.8	58.1

TABLE 4 Mean gender differences.

	Gender	Mean	Std. deviation	Mann–Whitney <i>U</i> sig.
ARTs	Male	8.41	2.239	0.001
	Female	8.91	1.802	
ARTs1: no pregnancy	Male	8.95	2.004	0.017
	Female	9.30	1.477	
ARTs2: male infertile	Male	8.37	2.354	0.000
	Female	9.01	1.861	
ARTs3: female infertile	Male	8.45	2.379	0.000
	Female	9.02	1.749	
ARTs4: genetic defect	Male	8.21	2.456	0.000
	Female	8.64	2.307	
ARTs5: sex choice	Male	5.15	3.176	0.004
	Female	4.57	3.064	
ARTs: discussion	Male	6.76	2.576	0.000
	Female	7.52	2.514	

coefficients between the core variables of the study are shown in Table 6. As seen in the table, a slight multicollinearity effect between two of the independent variables religiosity and conservative political orientation. However, the correlation coefficient is 0.3 which indicates a weak correlation among the them at a confidence level  $<0.01$  (Dancey and Reidy, 2007).

The estimated model is one in which the acceptance of ART variables are regressed on gender, religiosity, conservative political orientation, and control variables. The results of this regression are shown in Table 7.

The results reveal that the gender of the respondents is a predictor of the general acceptance of the use of ARTs and the use of ARTs in Scenarios 2 (infertility of the male partner), 3 (infertility of the female partner), and 5 (sex choice). These results are consistent with the results obtained in the Mann-Whitney *U* test and reinforce that women are more likely to support ARTs in general and in the case of one female infertility. Despite that, gender was not a predictor of ART acceptance in Scenarios 1 (infertility of the male partner) and 4 (genetic defect). These results indicate that a third variable, not gender,

should cause the observed gender differences in these two scenarios.

The variable religiosity harms the general acceptance of the use of ARTs and the use of ARTs in Scenarios 2–4, providing evidence to support H2. These results indicate that having a strong religious orientation would lead to lower acceptance of ARTs in cases of infertility and genetic defects.

The results also reveal that the variable conservative political orientation harms the general acceptance of the use of ARTs and the use of ARTs in Scenarios 1–4, providing evidence to support H3. These results indicate that having a conservative political orientation would explain a lower acceptance of ARTs in cases of infertility and genetic defects. The results are not significant for Scenario 5, the use of ARTs for choosing the sex of the child.

In terms of the control variables, the age of the respondents was found to be significant, being negatively related to the acceptance of ARTs in Scenarios 2 and 3 (infertility of one partner); nevertheless, contrary to expectation, educational level is a predictor of the acceptance of ARTs only in Scenario 5 (sex choice). On whether the respondents have children or not, having children positively affects the general support of ARTs

TABLE 5 Descriptive statistics for dependent and independent variables.

Definition variables	Mean	SD
<b>Dependent variables</b>		
ARTs	8.67	2.038
Please, indicate if you think that artificial insemination or <i>in vitro</i> fertilization can always be justified, if it can never be justified or that it is between one extreme and the other.		
ARTs1: no pregnancy	9.13	1.759
Think of a couple who wants to have a child, but the woman does not get pregnant. What would you think about fertilization in a medical laboratory with an ovum and sperm of their own?		
ARTs2: male infertility	8.70	2.137
Imagine a couple in which the man is infertile. What would you think about fertilization in a medical laboratory with donated sperm?		
ARTs3: female infertility	8.74	2.095
Imagine a couple in which the woman is infertile. What would you think about fertilization in a medical laboratory with a donated egg?		
ARTs4: genetic defect	8.43	2.388
In the case of a couple with a high risk of transmitting a genetic defect, what would you think about choosing one free of it in a medical laboratory among several fertilized eggs?		
ARTs5: sex choice	4.85	3.130
Imagine a couple who wants to choose the sex of their child. How acceptable is it for a medical laboratory to choose among several fertilized eggs that match your desire?		
<b>Independent variables</b>		
Gender (0: male; 1: female)	0.52	0.500
Religiosity (Likert 1–10)	2.55	1.422
Regardless of whether you belong to a particular religion, how religious do you consider yourself to be?		
Conservative political orientation (Likert 0–10)	4.49	2.882
In politics, we sometimes talk about “left” and “right.” Where would you place yourself on this scale of 0 to 10, where 0 means “left” and 10 means “right”?		

TABLE 6 Correlation matrix.

	ARTs	ARTs1	ARTs2	ARTs3	ARTs4	ARTs5	Religiosity	Conservative political orientation
Gender	0.107**	0.076*	0.152**	0.120**	0.114**	−0.093**	0.085**	−0.063
Religiosity	−0.183**	−0.183**	−0.177**	−0.187**	−0.162**	0.013	1.000	0.379**
Conservative political orientation	−0.198**	−0.204**	−0.233**	−0.236**	−0.189**	0.003	0.379**	1.000
Age	−0.042	0.000	−0.064*	−0.082**	0.011	−0.002	0.139**	0.044
Education	0.075*	0.112**	0.108**	0.108**	0.081*	−0.056	−0.83**	−0.068*
Children	0.026	0.063*	0.033	0.016	0.053	−0.013	0.087**	0.063
Income	0.069	0.077*	0.087*	0.095**	0.065	−0.011	−0.117**	−0.019

\*\*\*p < 0.001; \*\*p < 0.01; \*p < 0.05.

in Scenarios 1 (no pregnancy) and 2 (infertility of the female partner). Finally, respondents with a higher income are more likely to support the use of ARTs in general and in Scenario 2 (female infertility). These results do not support H4 but they do support H5 and H6.

## Discussion

This study's results align with the literature reviewed (Skedgel et al., 2021; Ziebe and Devroey, 2008). The results show that both men and women exhibit high acceptance rates



TABLE 7 Tested model: linear regression model for the acceptance of ARTs.

	ARTss		ARTss1		ARTss2		ARTss3		ARTss4		ARTss5	
	B	Std. error	B	Std. error	B	Std. error	B	Std. error	B	Std. error	B	Std. error
Gender	0.436**	0.141	0.205	0.124	0.494**	0.148	0.438**	0.144	0.290	0.175	-0.521*	0.243
Religiosity	-0.121***	0.030	-0.042	0.026	-0.080*	0.031	-0.068*	0.030	-0.084*	0.037	-0.041	0.052
Conservative political orientation	-0.066*	0.026	-0.099***	0.023	-0.125***	0.027	-0.115***	0.027	-0.117***	0.032	0.003	0.045
Age	-0.003	0.006	-0.007	0.005	-0.018**	0.006	-0.021***	0.006	-0.003	0.007	-0.003	0.010
Education	0.028	0.069	0.096	0.060	0.004	0.072	-0.024	0.070	0.054	0.085	-0.255*	0.118
Children	0.333	0.174	0.439**	0.152	0.407*	0.181	0.323	0.177	0.336	0.216	-0.030	0.300
Income	0.061*	0.028	0.017	0.024	0.058*	0.029	0.066*	0.028	0.057	0.034	0.022	0.048
R <sup>2</sup>	7.5%		6.5%		9.4%		8.9%		5.4%		1.5%	

\*\*\*p < 0.001; \*\*p < 0.01; \*p < 0.05.

of the general use of ARTs and the use of ARTs in different scenarios. These results evidence what can be considered a change in values, a significant social advance in terms of gender, and an overcoming of specific radical positions, such as extreme conservatism or feminism (Johnson, 2020). However, there is still a long way to go.

Delving into the different studied scenarios in which ARTs could be carried out, significant gender differences were found. These differences indicate that women show a significantly greater acceptance of ARTs than men in most scenarios. These are the scenario where a couple fails to achieve pregnancy, the scenario of male infertility, the scenario of female infertility and the scenario of a high risk of transmitting a genetic defect. The results coincide with previous studies, such as Enguer Gonsálbez and Ramón Fernández (2018), Yamamoto et al. (2018), and Szalma and Djundeva (2019). On the other hand, men show significantly greater acceptance of ARTs than women in the scenario of a couple who would like to choose the sex of their baby.

As an explication for women’s greater acceptance of ARTs, some authors point out that the patriarchal social structure has generated the idea of motherhood as a central element of female identity. Such a construct has forced the acceptance of ARTs as an alternative to natural pregnancy processes (Schenker and Eisenber, 1997; Marti Gual, 2011). Other authors, however, consider ARTs a liberation tool for women, as they can contribute to eliminating sexual differences and reverse the patriarchal order, increasing the options of having children outside marriage or heterosexual partnership. Under this prism, motherhood is a human right of free choice for women (Firestone, 1970; Haraway, 1995; Kimball, 2019; Takhar, 2022). From a more systemic and integrative view, we can consider that both positions and others are part of the existing reality where not all women feel or act in the same way toward motherhood. For their part, Szalma and Djundeva (2019) emphasize that postponing the transition to motherhood makes women more permissive in their attitudes toward ARTs, as they become a tool for a context that affects or will affect them personally.

ARTs open a door to satisfy the desire to be a mother. Now, if we start from the fact that the desire to be a mother is part of the control of women’s bodies by the patriarchal system, the results of this research would be in line with the authors who indicate that ARTs are an instrument to subjugate women. The fact that women show a favorable attitude toward ARTs is a symptom that the gender mandate still strongly reigns over women’s decisions regarding their maternity. ARTs would therefore be a double-edged sword since they increase women’s freedom of choice but at the same time perpetuate women in their reproductive role. In this sense, it might seem that those who, from conservative and religious positions, are against the use of ARTs could be close to feminist positions. However, it is necessary to specify that from conservative and religious positions the reticence goes hand in hand with the refusal to genetic manipulation.

Continuing with the analysis of gender differences, it is worth highlighting the scarcity of studies on the situations and feelings of men in the face of these patriarchal structural factors and ARTs (Hammarberg et al., 2017). Aspects such as the idea of paternity in the construction of male identity, the limitations to access ARTs and having children with a homosexual partner in Spain and other countries or the right to paternity are still subject to exploration. Perhaps these limiting structural factors could explain the lower involvement and acceptance of ARTs in the men in the sample due to the difficulty of considering a series of assumptions that, in many cases, will never happen, especially in men who do not have a partner or those who have a homosexual partner. More recent studies conclude that men aspire to fatherhood as much as women do, but have less knowledge about fertility and ARTs (Hammarberg et al., 2017), which could explain their lower acceptance of the use of ARTs under specific scenarios involving complex medical interventions. Moreover, men who access ARTs (due to their heterosexual condition and with a partner or through surrogate motherhood in certain countries) present an emotional involvement and affectation before ARTs comparable to that experienced by women. Social support is fundamental for men's and women's mental health in assisted reproduction processes (Molgora et al., 2020). Specifically, in this study, women were more aware of this need for support and social debate about ARTs.

Regarding other variables that may influence the acceptance of ARTs and coinciding with the majority of studies reviewed (Herrera et al., 2015), political conservatism and religiosity are related to a lower acceptance of ARTs in the sample of this study. This effect is of special relevance under the scenarios of infertility of one partner and the scenario of higher risk of a genetic defect. This rejection of the use of ARTs can be explained by religious reasons, such as not acting against the will of God, assuming that in ARTs there is no love, and understanding that ARTs involve the commercialization and manipulation of human life. These arguments cannot be generalized to all religions, but they reflect specific human fears and unveil the need for legal and ethical regulation of ARTs based on human rights.

The reviewed studies also suggest other variables that could moderate the relationship between conservative ideology, religiosity, and the acceptance of ARTs, as religious women who profess a doctrine contrary to ARTs, in practice, support the use of contraceptives, abortion and the use of ARTs over their ideological and religious conventions (Zareba et al., 2020). Irrázabal and Johnson (2019) describe this inconsistency as a process of individuation, personal autonomy and a lower influence of religious institutions. However, individual freedom does not prevent that, in many cases, the use of ARTs generates distress, anxiety, depression, and lack of social support in men and women (Molgora et al., 2020); in some cases, it is necessary to include religion and spirituality in the support process of ARTs.

Concerning the control variables that could influence the acceptance of ARTs, this study's educational level was only a predictor of ART rejection in the scenario of sex choice. This result differs from other studies that found a more significant relationship between educational level and ART acceptance (Herrera et al., 2015). Individuals with higher education levels suffer from precarious working conditions that lead to delaying childbearing and increasing female infertility with age. Therefore, scholarship suggests that the use of ARTs increases with the level of education (Bote and Martínez-Martínez, 2019). From this point of view, several studies claim the need for investment in public policies of reconciliation and employment that would allow earlier maternity. The socioeconomic factors also determine the acceptance of ARTs in our study. The variable of having children was found to positively affect the acceptance of ARTs in cases of not achieving pregnancy and infertility of the female partner. The socioeconomic level also leads to a stronger acceptance of ARTs. Finally, mention the study by Hammarberg et al. (2017), which points out that the main factor for increasing ART fertility rates is the lack of a partner unwilling to commit to parenthood.

## Conclusion

The results of this study show a high general acceptance of ARTs in both men and women.

Gender differences appear when specific assumptions about ARTs are addressed, with women showing greater interest and acceptance and interest in ARTs, which seems natural, given that it is a topic that affects or will affect them personally. In the same way, men's lesser acceptance of ARTs would have to do with a series of assumptions or scenarios that, in many cases, remain outside their realities. In Spain and other countries, men's contact with ARTs and their choice to become parents will be conditional on having a partner, and this partnership will be heterosexual. Thus, if the structural elements can put pressure on women while at the same time giving them great freedom in their choice of motherhood, they also pose a barrier between men and their desire for fatherhood.

Thus, maternity and paternity rights and work-life balance policies must be regulated in an egalitarian manner so that all social groups experience the same opportunities in all countries, overcoming all the structural factors and variables addressed in this study. Current studies equate the desire for maternity and paternity of men and women, their involvement in ART processes (although there are fewer male users, given their access limitations), and the psychosocial impact they experience once they access ARTs. All this evidence calls for the need for public policies of work-life balance, employment, and equality policies that improve the limiting structural factors, leading to a regulation of ARTs based on human rights. Additionally, greater education and social normalization of ARTs are needed,

as well as comprehensive support (bio-psycho-social-spiritual) for women and men who use them.

## Limitations

The quantitative methodology used in this work does not allow us to interpret or understand some of the significant results of the study, such as the greater general acceptance of the assumption of gender choice, as opposed to other assumptions based on fundamental rights.

In addition, future studies should measure in detail the constructs of the variables used, religiosity and conservatism. Moreover, given the weak multicollinearity effect among the variables used, religiosity, and conservatism, are insufficient to understand each individual's attitudes in different social situations. Upcoming work should include variables that show the mindset and motivations of the participants to accept different scenarios of individual freedom related to medical advances.

## Lines of debate

This study opens up a series of lines of debate on using ARTs. The first is that the gender perspective should be incorporated into the current discussion, making male gender more visible concerning ARTs. The second is the need for reconciliation policies so that women and men do not have to postpone their maternity and paternity because of their academic and working careers. Investing in reconciliation policies means saving ARTs and improving health. Third, a bioethical regulation of ARTs based on human rights, unification of laws, equalization of rights and resources among the different countries and groups is necessary. These regulations will allow for the inclusion of the use of this type of technique beyond the existing social tolerance. Finally, at the community level, forums for social debate should be generated to inform and normalize ARTs and to avoid the social stigma associated with them.

The present work opens different lines of research that should be addressed in future studies. In terms of methodology, future qualitative studies are proposed to explain the significance of the other assumptions of the study subjects, especially the assumption of children's sex choice. Future studies should further elaborate on this finding about the greater acceptance of men in the use of ARTs for the choice of children's sex. In principle, the preference for infant sex choice could be related to men's preferences for having sons. We do not have evidence in this regard and in the absence of conclusive studies in the Spanish context, if men's preferences were confirmed, the culture of discrimination would be fed. Moreover, we should note that in the scenario of choosing the sex of the baby the variables religiosity and conservative political orientation are

not significant, contrary to what occurs in the other scenarios studied. Future work will have to go deeper theoretically into the explanation of this fact.

Additionally, the identification of new variables that may explain some discrepant results, such as the acceptance and use of ARTs in confessing religious people, providing greater autonomy and individuation in this case to women, beyond social determinants and structural factors, we would do, possibly related to personal characteristics and evolutionary development (flexibility, open-mindedness, tolerance, post-conventional moral development, etc.).

Future work should also delve deeper into the situation and feelings of men about ARTs, the limiting structural factors, the place of the idea of paternity in their identity and the experience of infertility. They should also study the impact of ARTs on couples.

It is also proposed to study the design of psycho-educational interventions that include women, men and couples who approach ART processes integrally from a bio-psycho-social-spiritual and interdisciplinary perspective.

Finally, the impact of the availability of more information about ARTs should be studied, as well as community discussion forums, to avoid social stigma and increase the knowledge and social support of people who use these techniques. Universities could play a relevant role in this regard as disseminators of information on fertility, ARTs, policies for reconciling academic training-family/work activity and the associated risks.

## Data availability statement

The data analyzed in this study is subject to the following licenses/restrictions: the data analyzed is part of a joint research between different countries. Requests to access these datasets should be directed to [maurreko@deusto.es](mailto:maurreko@deusto.es).

## Ethics statement

The study involving human participants was reviewed and approved by the Research Ethics Committee of the University of Deusto. Written informed consent to participate in this study was not required from the participants in accordance with the national legislation and the institutional requirements.

## Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

## Funding

This work was funded by the Mineco-FrontVida Program, Frontiers of Life, Social Change, and Changing Values around the beginning and end of life.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships

that could be construed as a potential conflict of interest.

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