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Etiology of Homosexuality and Attitudes Toward Same-Sex Parenting: A Randomized Study

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Attribution theory suggests the hypothesis that heterosexuals' attitudes toward homosexual sexual orientation will be more negative when homosexuality is attributed to controllable causes. Our randomized study analyzed (a) whether beliefs about the genetic or environmental etiology of the homosexual sexual orientation can be immediately modified by reading a text and (b) the causal effect of attributions about the controllability (environmental etiology) or noncontrollability (genetic etiology) of homosexual sexual orientation on the rejection of same-sex parenting and their social rights. The sample was composed of 190 Spanish university students with a mean age of 22.07 years (SD = 8.46). The results show that beliefs about the etiology of the sexual orientation could be modified by means of a written text. Furthermore, participants who believed that sexual orientation had a genetic etiology showed greater support for social rights and less rejection of same-sex parenting. However, the effects were detected only when there was a traditional opposition to the family with same-sex parenting. When the opposition was normative, the effect was not statistically significant. Our results can be useful in planning variables for intervention programs designed to foster tolerance toward and normality of sexual diversity.

For years, studies have been carried out on attitudes toward homosexuality, toward individuals with a homosexual sexual orientation, and toward their social rights (Herek, 2002; Lee & Hicks, 2011; Schwartz, 2010). The relationship between beliefs about the etiology of the homosexual sexual orientation and the rejection of gay men and lesbians has been studied by researchers from the point of view of attribution theory (Haider-Markel & Joslyn, 2008). The belief that the homosexual orientation has a genetic etiology implies the assumption that this sexual orientation was not chosen by the individual. Instead, it is an innate and uncontrollable characteristic that relates genes to sexual orientation. In contrast, the belief that one's sexual orientation is learned means that it can be changed and even chosen as a lifestyle, attributing the responsibility for the sexual orientation to the individual. These two types of beliefs are related to the attitudes shown toward people with a homosexual sexual orientation. The belief about individuals' control/lack of control over their homosexual sexual orientation marks the difference in these attitudes (Herek, 1996).

According to attribution theory (Weiner, 1979, 1985; Weiner, Perry, & Magnusson, 1988), causal attributions for the homosexual sexual orientation play a key role in reactions of rejection and stigmatization toward gay men and lesbians. Attribution theory maintains that people's attitudes will be more favorable when the behaviors are not controllable than when the individual can control them (Dijker & Koomen, 2003). When people believe that homosexual sexual orientation is genetic (not controllable), they show less prejudice toward gay men and lesbians (Boysen & Vogel, 2007; Ernulf, Innala, & Whitam, 1989; Haslam, Bastian, Bain, & Kashima, 2006; Haslam, Rotschild, & Ernst, 2002; Hegarty, 2002; Hegarty & Pratto, 2001; Herek & Capitanio, 1995; Jayaratne et al., 2006; King, 2001; Landen & Innala, 2002; Sakalli, 2002; Weiner et al., 1988). The genetic attribution for the homosexual sexual orientation has even been shown to be a strong predictor of positive attitudes toward gay men and lesbians (Haslam & Levy, 2006). Haslam and Levy (2006) showed that beliefs about the biological origin of homosexuality, its immutability, and its universal presence in all cultures were associated with favorable attitudes toward individuals with a homosexual sexual orientation. As Dar-Nimrod and Heine (2011) pointed out, behaviors with moral implications apparently lose their moral force if people view these behaviors as being beyond the individual's will. In contrast, when the belief is that the sexual orientation is learned and the individual is responsible for choosing

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a homosexual orientation, the attitudes are much more negative (Aguero, Block, & Byrne, 1984; Dijker & Koomen, 2003; Frias-Navarro & Monterde-i-Bort, 2012; Frias-Navarro, Monterde-i-Bort, Barrientos-Delgado, Badenes-Ribera, & Cardenas-Castro, in press; Horvath & Ryan, 2003; Sakalli, 2002; Whitley, 1990; Wood & Bartkowski, 2004).

Beliefs about the etiology of the homosexual sexual orientation have also been related to opinions about the social rights of gay men and lesbians, such as marriage or adoption (Craig, Martinez, Kane, & Gainous, 2005; Jayaratne et al., 2006; Swank & Raiz, 2010; Tygart, 2000). For example, Haider-Markel and Joslyn (2005, 2008) showed that individuals who believe the cause of homosexual sexual orientation is genetic usually show greater support for same-sex marriage, compared to individuals who attribute nongenetic causes to homosexual orientation. Along the same lines, Haider-Markel and Joslyn (2008) concluded that attributions about the cause of the sexual orientation were the strongest predictors of support for same-sex marriages.

The effects of providing information about the etiology of homosexual sexual orientation on people's attitudes have not been consistent (Boysen, 2011; Hegarty, 2010). Unfortunately, the majority of the studies carried out in this context have used nonexperimental or correlational designs. The few studies that have experimentally altered attitudes toward gay men and lesbians by manipulating information about the reason for homosexual orientation have not had unanimous results. In some cases, biological explanations for the etiology of the homosexual sexual orientation have reduced the negative attitudes (Oldham & Kasser, 1999; Piskur & Degelman, 1992). In others, the change has not occurred in only one direction, as biological explanations can also increase negative attitudes (Oldham & Kasser, 1999). In addition, there have also been studies where the manipulation about the cause of the homosexual sexual orientation has not produced a statistically significant effect on the participants' attitudes (Pratarelli & Donaldson, 1997).

In the study by Piskur and Degelman (1992), the authors measured the effect of a text right after it was read. The study compared the scores of three conditions: an experimental condition that read a text focused on the biological differences between men with a homosexual sexual orientation and men with a heterosexual sexual orientation; a first control condition that read a text about the lack of hormonal differences between the two groups of men; and a second control condition that did not receive any text. The results showed that the mean scores of the experimental condition were less negative than those of the first control condition, but they did not differ in a statistically significant way from the mean scores of the second control condition.

The application of attribution theory to the rejection of same-sex parenting is a topic that has not yet been studied directly in the literature. Rejecting the quality of same-sex parenting implies evaluating the processes involved in raising and educating children. It is not about evaluating the right to be socially recognized as parents; instead, it has to do with evaluating the quality of same-sex parenting and its effects on the education and development of the children. In this sense, the present study was the first one to experimentally analyze the relationship between beliefs about the etiology of homosexuality and the rejection of same-sex parenting. To measure the rejection of same-sex parenting, an instrument was used that made it possible to analyze both individual and direct opposition to same-sex parenting and normative opposition, which is related to a model of subtle and modern rejection (Morrison & Morrison, 2002).

The main purpose of our study was to find out whether attributions about the genetic or learned etiology of the homosexual sexual orientation produce more or less rejection of same-sex parenting and whether they affect opinions about the social rights of individuals with a homosexual sexual orientation. To this end, an experimental methodology was used where the participant's belief was manipulated by reading a text (two experimental conditions: genetic etiology/environmental etiology). The assignment of the two texts was random. To show the effects of the biological or environmental explanations for the etiology of the homosexual sexual orientation on the participants' attitudes toward same-sex parenting, we measured the participants' initial beliefs (pretest phase) in three areas: (a) beliefs about the etiology of the sexual orientation; (bb) beliefs about the rights of same-sex couples; and (c) beliefs about the adjustment of children raised and educated by parents of the same sex. Next, we exposed the participants to material in the form of a text (manipulation of the variable under study) printed on paper.

Finally, we again measured the three variables (posttest phase). A double-blind experimental design was used, where the independent variable, which we call the ''Etiology of the Homosexual Sexual Orientation'', was manipulated. Neither the participants nor the evaluators knew the purpose of the study (double-blind technique). After the data were collected, the participants and evaluators were informed about the true purpose of the study. The possible threats to internal validity related to selection bias were controlled in the design due to the experimental nature of the methodology.

Our research hypothesis maintained that the scores of the two conditions on the rejection of same-sex parenting variable would show a statistically significant difference. Furthermore, it was expected that a statistically significant difference would also be detected in the opinions about the social rights of people with a homosexual sexual orientation. Specifically, participants who received the text about the learned or environmental etiology of homosexual sexual orientation would show greater rejection of same-sex parenting and less support for the social rights of gays and lesbians.

Method

Participants

The sample was composed of 190 Spanish university students in the psychology degree program, 39 (20.5%) men, 150 (79%) women, and one person who did not answer the question about sex (0.5%). The mean age of the participants was 22.07 years ($SD = 8.46$). All of the students were of Spanish nationality. The data collection took place in March 2012. In Spain, civil marriage between same-sex couples and their right to adopt children were legalized in 2004.

Materials and Procedure

To manipulate the independent variable, two texts were elaborated. One of them offered a genetic explanation for the differences in the etiology of sexual orientation (experimental condition, which we labeled "Genetic Etiology"). In the other text, the explanations pointed out the environmental etiology of the differences in sexual orientation (experimental condition, which we labeled "Environmental Etiology"). The structure of the texts created was similar; they were written in the same format as the evaluation notebook, and each text contained approximately 300 words. Both texts referred to specific research studies, such as studies with twins and hormone and hypothalamus studies. These references were used to make the texts more believable to the readers, regardless of whether they were familiar with the literature. The text beginning with "The environmental etiology of the homosexual sexual orientation is discovered..." contained 301 words, and the text beginning with "The genetic etiology of the homosexual sexual orientation is discovered..." contained 316 words (see the appendix for a full reproduction of the texts used). The participants randomly received one of the two texts. With each of the evaluation instruments, pretest and posttest measures were performed.

Beliefs about the Etiology of Sexual Orientation (BESO). This instrument measures individuals' beliefs about the etiology of the homosexual sexual orientation (Frias-Navarro, 2009c). It consists of two subscales: Genetic Etiology (GE) and Learned Etiology (LE). The subscale that measures attributions about a genetic etiology for the homosexual sexual orientation is made up of four items: "The homosexual sexual orientation is an inevitable behavior that depends on genetics"; "One's sexual orientation is caused by biological factors like genes and hormones"; "Genetic factors are the causes of the homosexual sexual orientation"; and "The homosexual sexual orientation is not chosen voluntarily because one is born homosexual." The subscale that measures the attributions about the learned etiology of the homosexual sexual orientation is also made up of four items: "A child who is raised by same-sex parents will have a greater probability of having a homosexual sexual preference"; "Children need a father and a mother to provide them with masculine and feminine role models"; "I think same-sex parents influence the sexual orientation of their children"; and "In many cases, homosexual behaviors are learned." A Likert-type response scale was used, ranging from 1 = *Completely disagree* to 5 = *Completely agree*. The higher the score, the greater is the belief about the genetic etiology of the homosexual sexual orientation (genetic etiology subscale) or the belief about the learned etiology (learned etiology subscale). The scores can range from 4 to 20.

Both subscales have shown a high internal consistency. In the pretest phase, the Cronbach's alpha values were 0.89 for the Genetic Etiology subscale and 0.80 for the Learned Etiology subscale. In the posttest phase, the values were 0.93 for Genetic Etiology and 0.88 for Learned Etiology.

Opinions About the Rights of Individuals With a Homosexual Sexual Orientation (ORHSO). This instrument measures opinions about the marriage and adoption rights of individuals with a homosexual sexual orientation (Frias-Navarro, 2009b). The scale consists of four items: "I think it is a social error to legalize marriage between people of the same sex"; "Children have the right to grow up in an environment that is as close as possible to the natural family with a father and mother"; "I have a lot of respect for the sexual orientation people might have, but allowing them to adopt involves the future of the child, and the best thing for his/her development is a father and a mother"; and "I have nothing against people with a homosexual orientation, but I don't think it's appropriate to call the union between same-sex couples marriage." A Likert-type response scale was used, ranging from 1 = *Completely disagree* to 5 = *Completely agree*. The lower the score, the more favorable the opinions are about homosexuals' marriage and adoption rights. Less favorable opinions are linked to higher scores on the instrument. The scores can range from 4 to 20. In the pretest phase, the Cronbach's alpha was .83, and in the posttest phase this value was 0.87.

Beliefs about Children's Adjustment in Same-Sex Families Scale (BCASSFS). This instrument measures participants' beliefs about the effects of child rearing and educational practices of same-sex parenting on the psychological and social adjustment of their children (Frias-Navarro, 2009a; Frias-Navarro & Monterde-i-Bort, 2012; Frias-Navarro et al., in press). It consists of 14 items distributed in two subscales: Normative Opposition (NOp) and Individual Opposition (IOp). A Likert-type response scale was used, ranging from 1 = *Completely disagree* to 5 = *Completely agree*. The

higher the score obtained, the greater the degree of rejection of the child rearing and educational practices of same-sex parents. The scale identifies two types of rejection of same-sex parenting: direct and traditional opposition on the individual opposition subscale, and subtle and modern opposition on the normative opposition subscale. The authors pointed out that the instrument was developed from the theoretical perspective of modern prejudice (Morrison & Morrison, 2002). The scores on each subscale can range from 7 to 35.

The Normative Opposition (NOp) subscale identifies beliefs and opinions linked to everyday heterosexism that are present in our society and represent a subtle form of heterosexism. The items on this subscale attribute the child's social rejection, and his or her maladjustment resulting from being part of a family with same-sex parents, to society, and not to the individual's own beliefs. This modern form of rejection is less open and aggressive than what is found on the Individual Opposition (IOp) subscale, but it attributes negative social consequences to the parenting quality of same-sex parents based solely on sexual orientation. Some items on the Normative Opposition subscale are, for example, ''A child adopted by a same-sex couple will be the butt of jokes and rejection by his/her classmates'' and ''The child raised by parents of the same sex will probably not be chosen as a leader by his/her classmates or friends.''

The IOp subscale identifies opinions involving open and more aggressive rejection of the child rearing and educational practices of same-sex parents. The difficulties and psychological maladjustment the children can experience are directly attributed to the homosexual sexual orientation of the parents. Some items on the subscale are, for example, ''If children are raised by parents of the same sex, they will have more problems with confusion about their own sexual identity than if they are raised by a father and a mother'' and ''If a child is adopted by a same-sex couple, he/she will surely have psychological problems in the future.''

The scores on the two subscales showed a high internal consistency. In the pretest phase, the Cronbach's alpha values were 0.88 for both the IOp and NOp subscales. In the posttest phase, the values were 0.90 for IOp and 0.92 for NOp.

Procedure

This study is part of a broader study about group relations and attitudes toward different social groups. The participants were guaranteed anonymity when filling out the paper-and-pencil questionnaires. Questionnaires were completed during class hours, and participation in the study was voluntary. The college was also chosen for convenience. Participants received a notebook with the information organized in the following way (the distribution of the notebooks was random): First, they received the instruments measuring beliefs about the etiology of homosexuality, opinions about the rights of gay men and lesbians, and opinions about the quality of education provided by same-sex parenting. Second, the participants read the text (Genetic Etiology/Environmental Etiology) assigned to them randomly. Third, after finishing the reading, they again answered the questions on the same measurement instruments applied in the beginning. Therefore, the effect of the experimental manipulation performed with the reading of the text was measured immediately.

Results

Following the recommendations of Curran, West, and Finch (1996), asymmetry values of 2 or more and kurtosis values of 7 or more are considered problematic. When the distribution of the variables approaches these values, normality is not assumed. The results of our analyses show that normality can be assumed for all scores on the measurement instruments utilized. Therefore, no adjustments were made to the scores on the variables measured in our study. The study design used to test the hypotheses was a mixed-method 2×2 ANOVA. The between-subjects factor was the condition (genetic/learned etiology), and the repeated-measures factor was the measure (pretest/posttest). The eta-squared effect size statistic was used as a measure of the magnitude of differences (Monterde-i-Bort, Pascual-Llobell, & Frias-Navarro, 2006; Navarro, Llobell, & Pérez, 2000).

Descriptive and Correlational Analyses

Table 1 shows the descriptive statistics of the variables used in the study: the beliefs about the etiology of the sexual orientation, the opinions about the rights of individuals with a homosexual sexual orientation, and the beliefs about the children's adjustment in same-sex families.

The mean scores on the rejection of same-sex parents variable (IOp and NOp subscales) show a lower score on the IOp subscale than on the NOp subscale, with the difference being statistically significant in the pretest phase (repeated-measures ANOVA, $F\ (1,\ 189) = 104.68$, $p < 0.001$, $\eta^2 = 0.36$) and in the posttest phase (repeated-measures ANOVA, $F\ (1,\ 189) = 104.68$, $p < 0.001$, $\eta^2 = 0.36$). These differences agree with the perspective of the modern rejection of people with a homosexual sexual orientation, as attitudes of subtle rejection (NOp) predominate over the more traditional and direct attitudes of rejection (IOp). In the pretest phase, the mean scores obtained showed a low level of rejection of same-sex parents. This result is quite similar to results from other studies that have used the Beliefs About Children's Adjustment in Same-Sex Families Scale (BCASSFS) with Spanish and Chilean samples (Cardenas-Castro, Barrientos-Delgado, Gomez, & Frias-Navarro, 2013; Frias-Navarro & Monterde-i-Bort, 2012).

Table 1. *Descriptive Analysis of the Instruments Used in the Study*

	Pre IOp	Post IOp	Pre NOp	Post NOp	Pre GE	Post GE	Pre LE	Post LE	Pre ORSHO	Post ORHSO
Mean	10.54	11.69	14.17	15.46	9.16	9.84	7.20	8.45	7.25	7.29
SD	4.71	5.78	4.95	5.94	4.19	4.93	3.24	4.24	3.90	4.02
Minimum	7	7	7	7	4	4	4	4	4	4
Maximum	32	33	32	35	20	20	18	20	20	20

Note. IOp = Individual Opposition; NOp = Normative Opposition; GE = Genetic Etiology of BESO; LE = Learned Etiology of BESO; ORHSO = Opinions About the Rights.

Table 2. *Correlations among All the Variables Analyzed in the Study*

Variable	Pre IOp	Post IOp	Pre NOp	Post NOp	Pre GE	Post GE	Pre LE	Post LE	Pre ORH
Post IOp	0.81**	—							
Pre NOp	0.49**	0.45**	—						
Post NOp	0.39**	0.51**	0.79**	—					
Pre GE	0.01	−0.03	0.09	0.06	—				
Post GE	−0.17*	−0.18*	−0.02	0.01	0.59**	—			
Pre LE	0.79**	0.67**	0.43**	0.34**	−0.02	−0.18**	—		
Post LE	0.68**	0.83**	0.39**	0.44**	−0.02	−0.22**	0.73**	—	
Pre ORH	0.83**	0.75**	0.37**	0.31**	0.11	−0.07	0.76**	0.67**	—
Post ORH	0.83**	0.84**	0.37**	0.34**	0.08	−0.13	0.72**	0.75**	0.91**

Note. IOp = Individual Opposition; NOp = Normative Opposition; GE = Genetic Etiology of BESO; LE = Learned Etiology of BESO; ORH = ORHSO (Opinions About the Rights).
*$p < 0.05$. **$p < 0.01$.

Table 2 includes the correlations among all the variables in both the pretest and posttest phases.

Success of the Experimental Manipulation

Beliefs about the Etiology of Sexual Orientation (BESO). The success of the experimental manipulation was examined by analyzing the Beliefs about the Etiology of Sexual Orientation (BESO) instrument. If the experimental manipulation using the presentation of the text was successful, in the posttest phase there would be statistically significant differences between the experimental conditions. The conditions were randomly assigned.

Once the text had been read, if there was an experimental effect, the participants who received the text with the Genetic Etiology condition were expected to increase their scores on the genetic etiology (attribution) subscale of the BESO instrument. Those participants who received the text with the Environmental Etiology condition were expected to increase their scores on the learned etiology (attribution) subscale of this instrument. It should be kept in mind that the higher the score, the greater the belief about the genetic etiology of the homosexual sexual orientation (genetic etiology subscale) or the belief about the learned etiology (learned etiology subscale). Table 3 shows the mean scores of the interaction effects for each of the variables measured.

Figures 1 and 2 present the interaction effects between the variable "measure" (pretest/posttest) and the variable "experimental condition" (genetic etiology condition/environmental etiology condition) for the Genetic Etiology subscale ($F\,(1, 175) = 65.44$, $p < 0.001$, $\eta^2 = 0.27$) and for the Environmental Etiology subscale ($F\ (1,\ 180) = 23.60,\ p < 0.001,\ \eta^2 = 0.12$). Indeed, the experimental manipulation produced a statistically significant interaction effect, so that the difference between the means of the two conditions was greater in the posttest phase on both subscales. The effect size was greater in the case of the Genetic Etiology subscale

Table 3. *Descriptive Statistics: Condition (Etiology Genetic/Environmental Etiology) and Measure (Pretest/Posttest)*

	Genetic Text		Environmental Text	
Scale	Pretest Mean (*SD*)	Posttest Mean (*SD*)	Pretest Mean (*SD*)	Posttest Mean (*SD*)
Genetic Etiology of BESO	9.30 (4.42)	12.31 (5.07)	9.06 (4.08)	7.65 (3.73)
Learned Etiology of BESO	6.77 (2.94)	7.00 (3.16)	7.56 (3.40)	9.76 (4.64)
Rights: ORHSO	6.74 (3.47)	6.51 (3.33)	7.70 (4.21)	8.00 (4.48)
Individual Opposition	9.85 (4.15)	10.38 (4.61)	11.17 (5.12)	12.90 (6.47)
Normative Opposition	13.75 (4.43)	14.90 (5.67)	14.56 (5.38)	15.97 (6.15)

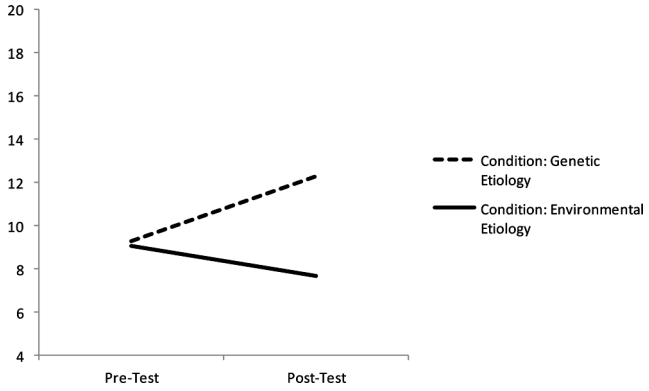

Figure 1. Effect of interaction and mean scores on subscale Genetic Etiology (BESO).

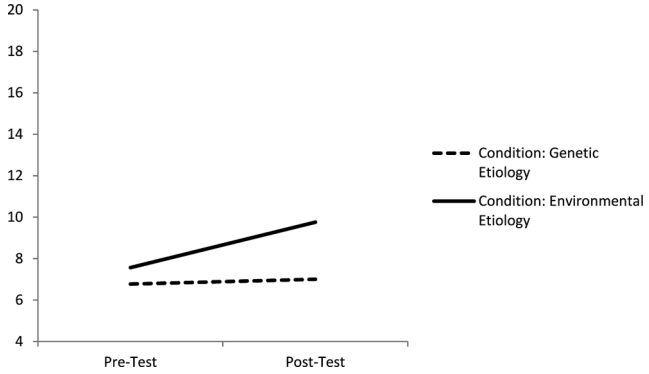

Figure 2. Effect of interaction and mean scores on subscale Learned Etiology (BESO).

of the BESO instrument, as the participants' scores in the experimental genetic etiology text condition increased, while there was a decrease in the participants' scores in the experimental environmental etiology text condition. The success of the experimental manipulation was also observed on the Learned Etiology subscale, as the participants' scores in the environmental etiology text condition increased, while the mean score of the participants in the Genetic Etiology condition almost remained constant.

We can conclude that the texts produced a statistically significant effect on the participants' beliefs about the etiology of the homosexual sexual orientation. In other words, the text that defended/justified the genetic etiology of the homosexual sexual orientation produced an increase in the scores on the subscale on beliefs about this genetic etiology compared to the condition that received the text that defended/justified the environmental etiology of the homosexual sexual orientation; and the text that defended/justified the environmental etiology of the homosexual orientation produced an increase in the scores on beliefs about the learned etiology of the homosexual sexual orientation compared to the condition that received the text that defended/justified the genetic etiology of the homosexual orientation.

Effects of the experimental manipulation and the opinions about the rights of individuals with a homosexual sexual orientation. To evaluate the effects of the experimental manipulation, the Opinions About the Rights of Individuals With a Homosexual Sexual Orientation (ORHSO) instrument was also used. The results of the 2×2 mixed design showed that there was a statistically significant interaction effect (F (1, 185) = 4.60, $p = 0.033$, $\eta^2 = 0.02$). The highest scores were obtained in the posttest phase by the participants in the environmental etiology text condition, showing less support for the social rights of marriage and adoption for same-sex couples (see Figure 3). The effect size was small. It should be kept in mind that on the OSHRO instrument, the higher the score, the less recognition of the rights of individuals with a homosexual sexual orientation.

Effects of the experimental manipulation and rejection of same-sex parenting. After showing the effects of the text received on the beliefs about the etiology of the homosexual sexual orientation, the analyses focused on studying the effects of beliefs about the etiology of the homosexual sexual orientation on attitudes toward same-sex parenting.

The results of the mixed designs made it possible to conclude that the experimental manipulation had a statistically significant interaction effect only on the IOp variable. After performing the manipulation of the independent variable through reading a text, it was observed that the participants' scores on the IOp dimension were higher when they received the environmental condition text than when they read the genetic etiology text ($F(1, 188) = 5.96$, $p < 0.001$, $\eta^2 = 0.10$) (see Figure 4).

Nevertheless, in the NOp dimension of the BCASSFS instrument, no statistically significant differences were detected in the interaction effect ($F(1, 188) = 0.24$, $p = 0.626$, $\eta^2 < 0.01$), with a practically null effect size (see Figure 5). There was also no statistically significant main effect of the factor "experimental condition" (genetic/learned) ($F(1, 188) = 1.58$, $p = 0.210$, $\eta^2 < 0.01$). However, a main effect was detected for the "measure" factor

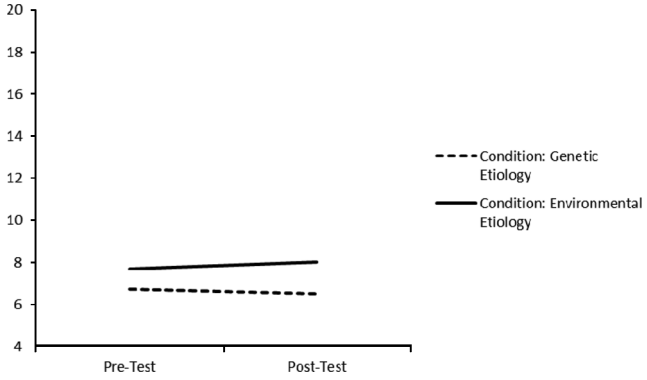

Figure 3. Effect of interaction and mean scores on Opinions About the Rights (ORHSO).

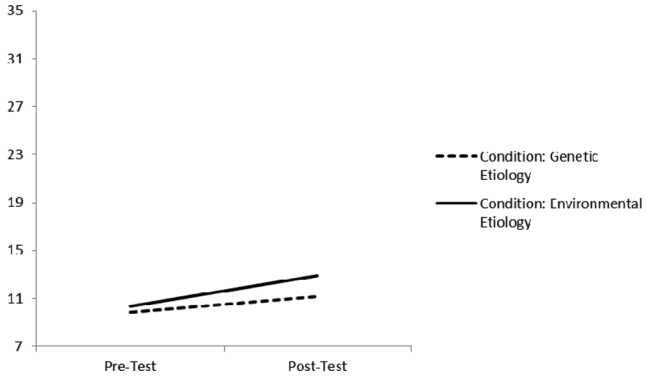

Figure 4. Effect of interaction and mean scores on subscale Individual Opposition (Beliefs About Children's Adjustment in Same-Sex Families Scale, BCASSFS).

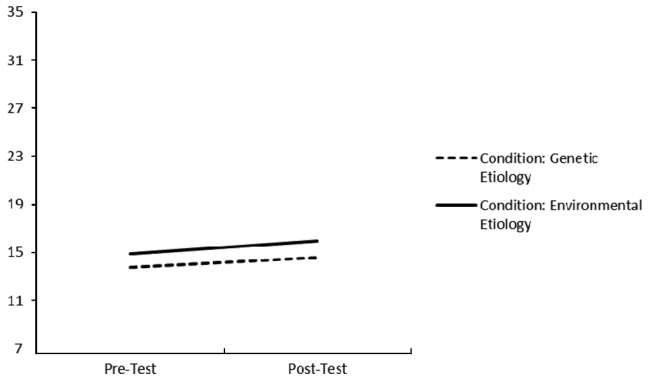

Figure 5. Effect of interaction and mean scores on subscale Normative Opposition (Beliefs About Children's Adjustment in Same-Sex Families Scale, BCASSFS).

(pretest/posttest) ($F(1, 188) = 23.15$, $p < 0.001$, $\eta^2 = 0.11$), with an increase in the scores in the posttest phase.

Discussion

Previous research demonstrated that there are many variables to consider in predicting attitudes toward homosexuality and gay rights issues. Our study has focused on the study of the relationship between beliefs about the origin of the homosexual sexual orientation and the rejection of same-sex parenting.

The results of our study lead to two especially relevant conclusions. First, beliefs about the etiology of the homosexual sexual orientation can be changed fairly easily by the presentation of written information labeled as scientific. When the text highlighted the genetic etiology of the homosexual orientation, the participants showed greater support for this etiology compared to the participants who received the environmental text. In contrast, when the text highlighted the environmental etiology of the homosexual sexual orientation, the participants who received instruction on the learned nature of the sexual orientation expressed greater support for the belief that the homosexual orientation is learned.

Second, participants' attributions about the biological or learned etiology of the homosexual sexual orientation affected their level of support for the social rights of gay men and lesbians and their level of rejection of same-sex parenting. The belief that the homosexual sexual orientation is learned (constructivist position) produced a greater rejection of same-sex parenting, compared to the scores of the participants who believed in a genetic etiology (essentialist position). However, this effect was only achieved with the more open and aggressive rejection of same-sex parenting, measured with the IOp subscale, as the effect was not statistically significant when measuring NOp, understood as subtle rejection. Thus, changing attitudes related to social heteronormativity required a greater effect.

Public opinion increasingly accepts same-sex marriage, but this apparently positive attitude toward gays and lesbians is much weaker when rating the quality of same-sex parenting (Morse, McLaren, & McLachlan, 2008). The negative attitudes toward same-sex parents are based, above all, on concern about the well-being of children who are raised with same-sex parents (Hollekim, Slaatten, & Anderssen, 2012). Our study supports these results and adds that the attributions about this rejection are supported by arguments of social rejection of families with same-sex parents (normative opposition).

The conclusions of our study support the model that maintains the attribution about the controllability or noncontrollability of the homosexual sexual orientation affects opinions about the social rights of gay men and lesbians and beliefs about the quality of their parenting (Horn & Heinze, 2011). When the participants attributed a noncontrollable origin (genetic) to the homosexual sexual orientation, they showed greater support for the rights of gay men and lesbians to marry and adopt children, compared to the participants who believed the origin is environmental.

Future research should also address the limitations of the current study. Our study design was limited by the characteristics of the sample participants. The sample was composed of Spanish psychology students, a group generally characterized by liberal attitudes. In general, previous research has suggested that women and younger individuals are more accepting of people with a homosexual sexual orientation (Ahrold & Meston, 2010; Herek, 2002). In our study, the high proportion of female participants may have affected the opinions about same-sex parenting. In the same way, age was also a variable that limits the results of our study. For example, Avery and colleagues (2007) pointed out that age is a variable that predicts attitudes toward people with a homosexual sexual orientation and acceptance of their social rights. The authors noted that older Americans tend to be less supportive of gay rights than younger Americans, and they suggested that this is

related to the fact that older people tend to have more conservative political orientations than younger people. Furthermore, our study did not evaluate the possible long-term effects of the beliefs on individuals' attitudes. The immediate impact of causal information may not translate into permanent attitude change. It would be advisable to perform studies to replicate the results to verify the consistency of the effects and lend external validity to our findings. The possible social desirability of the responses was not measured either. Finally, another limitation of our study was related to the ORHSO scale, where all items directly measure opinions about the rights of individuals with a homosexual sexual orientation, and the problem of social desirability could be present. Moreover, two items on the ORHSO scale seem to measure two variables at the same time; therefore, it would be interesting to replicate the study after rewriting these items ("I have a lot of respect for the sexual orientation people might have, but allowing them to adopt involves the future of the child, and the best thing for his/her development is a father and a mother" and "I have nothing against people with a homosexual sexual orientation, but I don't think it's appropriate to call the union between same-sex couples marriage").

The debate about the social and sexual normality of the homosexual sexual orientation is reopened from time to time, in spite of advances made in recognizing the rights of people with a homosexual sexual orientation. Open and aggressive expression of ideas and behaviors of rejection toward the homosexual orientation has become considerably reduced. However, our study results point to the transformation of the rejection into more subtle and correct forms from a social point of view. In other words, the characteristics of the prejudice have been transformed, giving rise to a new model known as modern prejudice (Morrison & Morrison, 2002, 2008). Even in the 21st century, it is important to construct new measurement instruments adapted to the current reality and continue to study the new prejudice. Based on studies on stigmatization, the question is not whether one's sexual orientation can be changed. Instead, what is truly relevant is to study individuals' beliefs and opinions about the etiology of homosexual sexual orientation. Above all, research should focus on reducing prejudice toward people with a homosexual sexual orientation. As Herek and McLemore (2013) pointed out, the analysis of the change produced in the attitudes toward people with a homosexual sexual orientation should consider the cultural and social psychological processes through which the stigma is internalized by individuals.

In summary, understanding the motivations and cognitions linked to sexual prejudice can aid in its prevention and reduction. In this sense, the results of our study provide information that can be useful in programming intervention studies. Knowing more about the variables that affect these beliefs will make it possible to create intervention programs designed to modify irrational beliefs about the homosexual sexual orientation. For example, interventions that reduce sexual prejudice in individuals who believe the etiology of homosexuality is biological will probably not be as effective as interventions with individuals who believe it is learned. Furthermore, investigating and discovering how gender identity is socially constructed can help us perfect awareness campaigns and educational programs on tolerance and acceptance of diversity (Kimmel, 1997). Moreover, understanding the development of the heterosexual sexual identity is also a fundamental issue when analyzing improvements in the attitudes toward people with a homosexual sexual orientation (Worthington, Savoy, Dillon, & Vernaglia, 2002). We are not familiar with the contents of the school curriculum in childhood and adolescence, but presenting contents about the topic of sexual orientation is fundamental to avoid interpretations and beliefs that will later lead to the rejection of individuals who do not have a heterosexual sexual orientation. Tolerance and acceptance of diversity are basic variables that are learned in childhood, where instruction in schools must avoid arguments based on heteronormativity. However, we agree with Horn and Heinze (2011) that beliefs about a biological etiology of homosexual sexual orientation are not a cure-all for reducing sexual prejudice. Nevertheless, parents, teachers, instructors, therapists, health professionals, and even the news media should consider the explanations they offer about the origin of the sexual orientation, avoiding simple explanations based on the learning model or childhood imitation, as they favor beliefs and attitudes of rejection toward individuals with a homosexual sexual orientation.

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Appendix

Below, the two texts used as experimental conditions are presented.

(A) "Environmental Etiology" Condition

"The environmental etiology of the homosexual sexual orientation is discovered...." The issue of sexual orientation is a topic of scientific debate. Opinions revolve around a biological or environmental etiology. However, from the 1990s on, discoveries have supported the environmental basis for one's sexual orientation. Thus, the experiences one has in the first years of life (such as games, interactions with friends, family experiences) are crucial in the formation of the sexual orientation. Children learn what they see, and the way they experience their sexuality also involves learning.

Scientific results do not support the genetic basis for the homosexual sexual orientation. Instead, they promote environmental interpretations as the reason for the sexual orientation. Discoveries about environmental bases for the homosexual orientation are rapidly being made in the areas of developmental psychology and studies with twins.

Studies in developmental psychology highlight the importance of the roles imposed by the family regarding one's sexual identification and what is considered masculine or feminine. The reinforcement of certain gender behaviors will favor their learning and, therefore, their development.

Studies with identical twins: Discoveries with identical twins (monozygotic) have shown that the homosexual sexual orientation is not inherited because, if it were, identical twins would have to develop the same sexual orientation. However, the percentage of identical twins with a homosexual sexual orientation is similar to that of nonidentical twins and siblings, highlighting the effect of family and social interactions as key elements in the development of the sexual orientation. For example, it has been shown that one is more likely to have a homosexual sexual orientation when there is a homosexual sibling, even when he/she was adopted.

(B) "Genetic Etiology" Condition

"The genetic etiology of the homosexual sexual orientation is discovered...." The issue of the sexual orientation is a topic of scientific debate. Opinions revolve around a biological or environmental etiology. However, from the 1990s on, discoveries have supported the genetic basis for one's sexual orientation. After all, a large percentage of our behaviors have an inherited component.

Scientific results support the genetic basis for the homosexual sexual orientation. Since 1991 there has been a body of scientific investigation that defends a biological predisposition toward the homosexual sexual orientation. Discoveries about the genetic bases of the homosexual orientation are rapidly being made in the areas of:

With identical twins: Discoveries with identical twins (monozygotic) have shown that the homosexual sexual orientation is inherited. The percentage of identical twins with a homosexual sexual orientation is greater than that of nonidentical twins or siblings.

Neuroendocrine-hormonal studies: The homosexual sexual orientation is related to the exposure to certain hormones before birth. The data from neuroendocrine studies point out that the sexual orientation is determined by the effects of the level of androgens on the neuronal structures. If these structures are exposed to certain levels of androgens, they become masculinized and produce an attraction toward women. In contrast,

if exposure to high levels of androgens does not occur, the structures do not become masculinized, and an attraction toward men is produced.

Forensic studies: LeVay (1991, 1993), a neuron pathologist from the University of California, compared the hypothalamus in men with a homosexual sexual orientation and men with a heterosexual sexual orientation. LeVay observed that there are structural differences between the two groups of men in the size of the INAH3 (Interstitial Nuclei of the Anterior Hypothalamus). This structure is smaller in people who feel an attraction toward men.