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ABSTRACT.

Previous studies which have measured beliefs about sexual orientation with either a single item, or a one-dimensional scale are discussed. In the present study beliefs were observed to vary along two dimensions: the “immutability” of sexual orientation and the “fundamentality” of a categorization of persons as heterosexuals and homosexuals. While conceptually related, these two dimensions were empirically distinct on several counts. They were negatively correlated with each other. Condemning attitudes toward lesbians and gay men were correlated positively with fundamentality but negatively with immutability. Immutability, but not fundamentality, affected the assimilation of a biological determinist argument. The relationship between sexual orientation beliefs and anti-gay prejudice is discussed and suggestions for empirical studies of sexual orientation beliefs are presented.

KEYWORDS. Sexual orientation immutability, biological determinism and sexual orientation, prejudice and beliefs about sexual orientation

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In recent years public arguments about the “biology of sexual orientation” have become commonplace (e.g., Byne & Parsons, 1993; LeVay & Hamer, 1994) leading to several academic debates about the nature of the trait (e.g., De Cecco & Elia, 1993; De Cecco & Parker, 1995). In addition to such arguments, some authors have claimed that changes in beliefs about sexual orientation will lead to improvements in attitudes toward lesbians and gay men. For example, in response to LeVay’s (1991) study of the hypothalamus, the sexologist and legal expert Richard Green argued as follows:

So, if we can find, the scientists can find, that a specific part of the brain is primarily responsible for sexual orientation, then the stigmatization and the legal discrimination against gays and lesbians in this country should fall. (Green, quoted in Halley, 1994, p. 504)

Such an argument linking attitudes to beliefs is theoretically supported by attribution theory in social psychology, which claims that stigmatized persons are treated less harshly if their stigmatized trait is believed to be beyond personal control (cf. Weiner, Perry & Magnuson, 1989). More direct support for this argument can be found in the empirical literature on anti-gay attitudes itself. Agüero, Bloch, and Byrne (1984) found that students who held genetic determinist beliefs were more tolerant than students who believed that sexual orientation was freely chosen. In a national sample of Black Americans, Herek and Capitano (1995) found that respondents who believed homosexuality to be biological rather than chosen were also more tolerant. One public opinion poll found that persons who believed that being gay is “something people choose to be” were less likely to be supportive of gay and lesbians’ rights and more likely to consider homosexuality morally wrong than persons who believed that being homosexual is “something that cannot be changed” (Schmalz, 1993). In an experimental study Piskur and Deegman (1992) provided students with information about biological differences between homosexual and heterosexual men, information about biological similarities between the two groups, or no information. Respondents’ attitudes were subsequently assessed. Women who read about biological differences reported significantly more tolerant attitudes than women in the two control conditions, but this trend was not significant among the men.

In light of such evidence, social scientists have also argued that changing beliefs about sexual orientation can change anti-gay attitudes. Whitley (1990) reported that students who believed sexual orientation to be under personal control were less tolerant of gay men and lesbians. He argued that college sexuality courses were most likely successful in fostering positive attitudes towards lesbians and gay men because they propose a biological approach to sexual orientation.

The present paper addresses both the ways in which beliefs about the nature of sexual orientation (hereafter “sexual orientation beliefs”) are measured and the causal relationship between such beliefs and the assimilation of biological claims about this trait. First we examine the ways in which beliefs about sexual orientation have been measured and provide alternatives. Next, by examining how beliefs and attitudes affect the assimilation of biological determinist arguments we illuminate the causal relationships between beliefs, attitudes, and biological claims in this area.

Sexual Orientation Beliefs

None of the studies of attitudes toward lesbians and gay men have measured beliefs in quite the same way. Whitley (1990) assessed beliefs in controllability. Other studies used forced choice items between biological determinism, or non-controllability on the one hand and free choice, or changeability, on the other (e.g., Herek & Capitano, 1995; Schmalz, 1993). Agüero et al. (1984) presented three belief items about genetic determinism, homosexuals being able to “help being the way they are,” and the possibility of therapy changing homosexual preference. All three items subsequently loaded on a single factor.

However, beliefs in “a lack of control” and the “biological basis” of a trait are not necessarily the same thing. It is easy to call to mind traits that are considered “biological” but can still be controlled or altered (e.g., diabetes). Other entities are resilient to change but are not commonly thought of as “biological” (e.g., heterosexist ideologies). Indeed, some widespread heterosexist belief systems recognize and deploy the difference between “biology” and “non-controllability.” For example, Catholicism explicitly admits that for some people homosexual desire is natural while requiring its followers to “control” such desire (cf. Dynes & Donaldson, 1992; p. 238-239). For a follower of this belief system evidence of “a biological basis” of sexual orientation may not warrant the expression of a gay, lesbian, or bisexual identity. Clearly, if empirical studies are to be relevant to social efforts to ameliorating heterosexism then the distinction between beliefs about “biology” and “a lack of control” must be understood.

A second reason to scrutinize sexual orientation beliefs is that the salient axes of disagreement about this trait may change with time. Contemporary studies have focused on issues such as biology, choice, and controllability. However, a generation ago, Levitt and Klassen (1974) found widespread endorsement for beliefs such as “young homosexuals become that way because of older homosexuals” and “people become homosexual because of how their parents raised them.” Neither of these statements directly implies “biology,” “choice,” or “a lack of control” per se. The empirical results of older and contemporary studies together suggest that both axes of popular opinion about sexual orientation and the methods used to study them can and do change over time.

The first wave of the present study aimed to broaden studies of beliefs about sexual orientation and to make them relevant to contemporary interdisciplinary “essentialist-constructivist” debates about the nature of sexual orientation and the meaning of biological claims about that trait (cf. De Cecco & Parker, 1995). We used these debates as a starting point in constructing belief items. Other participants in these debates have noted how both “pro-gay” and “anti-gay” arguments can be articulated on both sides of these issues (e.g., Halley, 1994; Weinrich, 1995). Consequently, we investigated empirically the relationship between these belief items and attitudes toward lesbians and gay men. The beliefs we constructed assessed the following four broad dimensions of debate.

Early determinacy (items 1 & 2, see Table 1): the belief that sexual orientation is determined early in the life-span, before the manifestation of adult sexuality. Early determinacy underlies current (LeVay & Hamer, 1994) and earlier (Dorner, 1976) biological models, psychoanalytic models (Freud, 1905), and other developmental models in psychology (Bell, Weinberg, & Hammersmith, 1981).

Essential identity (items 3 & 4): the belief that sexual orientation is a basic organizing principal of individual psychology. Laner and Laner (1980) argued that beliefs in psychological differences between gay and straight persons are homophobic in general. However, some psychologists argue that gay men and lesbians lead exceptional lives because they overcome prejudice (D’Augelli, 1994) or live in both gay and straight contexts (Brown, 1989).

Adult fixity (items 5, 6, & 7): the belief that sexual orientation is immutable once it emerges. Beliefs in adult fixity do not necessarily follow logically from beliefs in early determinacy. Some heterosexist psychoanalytic theories are early determinacy theories but claim that adult sexual orientations can be changed through intervention (cf. Bayer, 1981). More recently discourse analysts have examined the discursive construction of transitions between sexual identities in adulthood (Kitzinger & Wilkinson, 1995).

Homosexuality/heterosexual binary (items 8 & 9): the belief that persons can be divided into two categories based on sexual orientation. Cross-cultural evidence has often been used to

argue that homosexuality and heterosexuality are natural entities (e.g., Ellis, 1905; Ford & Beach, 1951). However, contemporary lesbian and gay scholarship in anthropology emphasizes that not all cultures organize identity around a heterosexual/homosexual binary (cf. Morris, 1995; Weston, 1993).

Biased Assimilation of Biological Arguments

The second wave of this study examined the relationship between attitudes toward lesbians and gay men, beliefs about sexual orientation, and the assimilation of biological determinist arguments. As noted above, previous studies have shown a correlation between beliefs and attitudes, and causal inferences have been made between the presentation of biological arguments and changes in beliefs and even attitudes.

However, attitudes and beliefs may also affect the assimilation of biological claims. Lou Sheldon of the Family Values Coalition publicly claimed that if sexual orientation were proved to be genetic, that a “genetic cure” (sic) should be sought (Watson & Shapiro, 1995, p. 96). This response shows that for extremists, in contrast to predictions such as those of Richard Green, biological evidence does not simply change attitudes, but attitudes also shape the interpretation of biological evidence. In the second wave of this study we tested whether students’ beliefs and attitudes also tempered their understanding of biological arguments.

Social and cognitive psychologists have extensively studied how arguments that inform prior beliefs are evaluated (e.g., Edwards & Smith, 1996; Klayman & Ha, 1987; Kunda, 1990; Lord, Lepper, & Ross, 1979; Wason, 1960). Lord et. al (1979) introduced the term “biased assimilation” to refer to the tendency to consider arguments that are in agreement with pre-existing beliefs to be superior than those that contradict those beliefs. They presented supporters and opponents of the death penalty with a study which supported the efficacy of the death penalty as a crime deterrent and one which refuted it. Participants on both sides of the debate showed biased assimilation by rating the study which agreed with their beliefs as both more convincing and better carried out than the study which undermined their position. Furthermore, participation in this experiment did not reduce disagreement between the two groups but rather lead to “attitude polarization”; both groups were more convinced of the correctness of their original position after reading the mixed body of evidence than before.

Subsequent studies have investigated biased assimilation in domains such as AIDS prevention education (Slusher & Anderson, 1996), assessing the guilt of accused rape perpetrators (Weiner, Weiner, & Grisso, 1989), and the possibility of technological accidents (Plous, 1991). Miller, McHockey, Bane, and Dowd (1993) critiqued the original Lord et al. (1979) study by demonstrating that the attitude polarization effect is limited to certain types of attitude assessment. However, they found that biased assimilation was robust across a range of attitude assessment methods.

Biased assimilation appears to be most likely to occur when new information is invested with emotion (Edwards & Smith, 1996) or has consequences for beliefs about the self (e.g., Kunda, 1990; Ditto & Lopez, 1992). Because beliefs about our sexualities refer to a core aspect of identity and are emotionally laden (Plummer, 1995), and attitudes about gay men have been shown to lead to biased assimilation (Slusher & Anderson, 1996), we investigated this phenomenon in regard to sexual orientation beliefs.

Thus, the second wave of the present study investigated biased assimilation of a biological determinist argument linking birth order to sexual orientation in men. As we were assessing the assimilation of new evidence, we attempted to choose a topic, which would be unfamiliar to participants in its details. Reports about birth order and sexual orientation have been produced in recent years (e.g., Blanchard & Bogert, 1996; Blanchard, Zucker, Bradley,

& Hume, 1995) but are less thoroughly popularized than reports about brain structure or genetics (e.g., Hamer, Hu, Magnuson, Hu, & Pattatucci, 1993; LeVay, 1991). However, claims about birth order also imply early determinacy, adult fixity, essential identity, and the homosexual/heterosexual binary and so serve as a reasonable model for reactions to other more thoroughly popularized claims. Because recent biological determinist research on sexual orientation focuses mostly on male subjects, we choose to examine biased assimilation of claims about differences between gay and straight men.

Method

Participants One hundred and sixteen students (44 males, 72 females) at a large private university completed both sets of materials for partial course credit. Participants' ages ranged from 17 to 22 years (Mean = 18.9 years).

Materials Two sets of materials were employed in this study. The first set contained the Attitudes Toward Lesbians and Gay Men scale (hereafter ATLG), a set of belief items, and a demographic questionnaire. ATLG is a 20-item scale assessing individual differences among heterosexuals' attitudes toward lesbians and gay men (Herek, 1984; 1994). The form of this scale reprinted in Herek (1994) was employed (Note 1). Ten 9-point Likert items addressed attitudes towards lesbians (ATL subscale) and ten 9-point Likert items addressed attitudes towards gay men (ATG subscale). ATLG scores are reported here as the mean of all items answered, such that ATLG scores range from 1 (indicating tolerance) to 9 (indicating condemnation).

The nine sexual orientation belief items are listed in Table 1. The demographic questionnaire asked participants to identify their (1) sex, (2) ethnicity, (3) sexual orientation (heterosexual, gay/lesbian, bisexual, or other), (4) religion, (5) frequency of religious practice (more often than weekly, once a week, once a month, once a year, or less frequently), and (6) degree of endorsement of a major religious belief system on a 5-point scale.

The second set of materials consisted of a false news report on birth order and sexual orientation. This bogus report was presented as one that appeared in a newspaper. Respondents were asked to read the report and rate their agreement with ten evaluative questions about the research. The report and these questions are listed in the Appendix.

Procedure. Materials were inserted into larger take-home questionnaire packets. These packets were distributed in class approximately four weeks apart. Each participant wrote an identifying number on each set of materials allowing a subsequent matching of the two sets by participant, while assuring anonymity.

Results

Participant Selection. Two hundred and twelve participants completed the first set of materials and 146 completed the second set. Using identifying numbers it was possible to match 118 complete sets of materials. One participant who checked the "unsure" response to the item on sexual orientation and one participant who did not complete the ATLG scale were excluded. All other 116 participants identified themselves as heterosexual and were included in the following analysis.

ATLG and Demographic Variables Wave one of the study allowed us to investigate the relationship between attitudes toward lesbians and gay men and several demographic variables. Both the ATL and ATG scales were internally consistent (Cronbach's alpha = .88, .91 respectively). Because ATL and ATG were highly correlated ($r = +0.82$) and the pattern of results does not differ substantively when ATL and ATG are considered

separately, ATLG is reported as the sole measure of attitudes in the analyses below. Men had higher ATLG scores than women ($M_s = 3.19, 2.26$ respectively), $t(114) = 3.62, p < .01$ (Note 2). ATLG was positively correlated with conservatism, $r = +0.365, p < .01$, religious participation, $r = +0.32, p < .01$, and degree of religious belief, $r = +0.24, p < .01$. Thus as in previous studies, ATLG scores were highly internally reliable and the most negative attitudes were reported by men, religious participants and self-identified conservatives (Herek, 1994; Kite & Whitley, 1996).

ATLG and Beliefs About Sexual Orientation Wave one of the study also allowed us to examine the relationship between beliefs about sexual orientation and attitudes toward lesbians and gay men. A factor analysis was performed on the ratings of the nine belief items (Note 3). Two components emerged which explained 44.4% of the variance in responses. Table 1 reports item loadings with absolute values greater than .35 on these two factors subsequent to a varimax rotation.

The first factor was interpreted as belief in the immutability and the second factor as belief in the fundamentality of sexual orientation. The items that were designed to assess early determinacy and adult change loaded on the immutability factor (see Table 1). Immutability was interpreted as reflecting the degree to which sexual orientation is understood to be fixed across the life span. The items that were designed to assess essential identity and the homosexual/heterosexual binary loaded on the fundamentality factor (see Table 1). Fundamentality was interpreted as the belief that persons can be classified as homosexual and heterosexual and that there are fundamental psychological differences between the members of these two groups. Although conceptually these two concepts may appear more similar than different, immutability and fundamentality scores were significantly negatively correlated, $r = -0.23, p < .05$.

Next the relationships between fundamentality and immutability factor scores and anti-gay attitudes were assessed. Immutability was significantly negatively correlated with ATLG, $r = -0.39, p < .01$. In other words, a belief in immutability co-occurred with tolerance of lesbians and gay men. In contrast, fundamentality was significantly positively correlated with ATLG, $r = +0.33, p < .01$. In other words, a belief in fundamentality co-occurred with condemnation of lesbians and gay men. Thus immutability and fundamentality were also distinct in regard to their relationships to attitudes. The correlation of each individual belief item with ATLG is reported in Table 1.

Conceptually, both immutability and fundamentality appear consonant with biological determinist arguments. Biological markers of sexual orientation could exist prior to coming out and independently of how persons self-identify or behave. Such markers also provide a scientific rationale for a “natural” or “fundamental” classification of persons as heterosexual and homosexual persons. We predicted that persons who scored high on immutability and fundamentality beliefs would give a higher endorsement of the biological determinist argument.

Biased Assimilation of the Bogus Report Wave two of the study allowed us to examine if the assimilation of the biological determinist argument was influenced by attitudes toward lesbians and gay men, and immutability and fundamentality beliefs. A principal components analysis was performed on responses to the bogus report. Eight items (Item 1 and Items 3-9, see Appendix) loaded on a single factor with an Eigenvalue of 4.19, which explained 52.4% of the variance in response. This measure was internally reliable ($\alpha = .86$). A single measure labelled “report evaluation” was calculated as each participant’s mean response to these eight items.

There was no evidence of an effect of attitudes towards gay men and lesbians on the assimilation of the biological claims; ATLG scores and report evaluation were unrelated, $r =$

+ 0.07, n.s. Contrary to our predictions, fundamentality beliefs did not affect the assimilation of biological claims either, $r = +.04$, n.s. However, an effect of immutability beliefs in the predicted direction on report evaluation was observed, $r = +.18$, $p < .03$ (one-tailed). Persons who believed that sexual orientation was a fixed trait across the life span were more likely to be impressed by the biological determinist claims presented in the report than those who did not hold this belief.

Discussion

Students' beliefs about sexual orientation were described by two factors: immutability and fundamentality. While both might be regarded as "essentialist" we found considerable evidence that they are quite distinct. Immutability and fundamentality scores were negatively correlated; endorsement of one set of beliefs co-occurred with rejection of the other. Secondly, ATLG correlated significantly negatively with immutability beliefs but correlated significantly positively with fundamentality scores. Thus these beliefs have opposing implications for anti-gay attitudes. Finally, even though biological determinist evidence appears to be consonant with both immutability and fundamentality beliefs, immutability scores predicted the biased assimilation of a biological determinist claim but fundamentality scores did not.

The relationships between ATLG and religiosity, conservatism, and gender that were observed replicated the findings of previous studies (cf. Herek, 1994). It should be noted, however, that findings on attitudes among college students and other populations sometimes differ (Kite & Whitley, 1996; Whitley & Kite, 1995). Also, our belief items employed targets of unspecified sex allowing participants to interpret the items to refer only to men (cf. Black & Stevenson, 1984).

The relationship between fundamentality beliefs and attitudes is interesting in light of social identity theory which holds that people are motivated to differentiate between groups so that they can discriminate in favor of their own group (Tajfel & Turner, 1986). More prejudiced persons may have a greater desire for clear distinctions between real social groups. Martin and Parker (1995) showed that students who were intolerant of ambiguity were more likely to believe that sex and race differences were due to biological factors rather than socialization factors. Blascovich, Wyer, Swart, and Kibler (1997) observed that racially prejudiced persons take longer to categorize racially ambiguous faces, and may also be more motivated to categorize them. Given that sexual orientation is often not an easily identifiable trait, heterosexual persons might be particularly motivated to maintain a categorical distinction between gay and straight persons and to render gay, lesbian and bisexual persons identifiable so that they can be discriminated against.

Attribution theory can account for the correlation between immutability beliefs and anti-gay attitudes observed in this study. However, attribution theory also emphasizes that beliefs are the basis of attitudes toward stigmatized groups (Weiner et al., 1989; Whitley, 1990) and in this study we observed that immutability beliefs also influence the way new claims are assimilated. Claims relevant to immutability, such as biological determinist arguments, may influence anti-gay attitudes (Piskur & Deegman, 1992), but the present study shows that prior beliefs may also affect whether such evidence is accepted or dismissed. Recall also that the anti-gay ideologue Lou Sheldon replied to a biological argument by disputing that it implied immutability. Clearly, there is a more complex relationship between the processing of biological arguments, sexual orientation beliefs and anti-gay attitudes than either attribution theory, or commentators such as Green have anticipated.

Therefore, the relationships among immutability beliefs, anti-gay attitudes and the assimilation of biological evidence need further exploration. Following from the present study, one plausible hypothesis is that much debate about biology rests on deeper concerns

about perceptions of immutability. In the present study attitudes correlated with immutability beliefs which predicted reactions to the bogus report, but attitudes did not predict biased assimilation directly. Possibly biological arguments are typically constructed as implying immutability of sexual orientation. This would explain previously observed relationships between attitudes and “biology/choice” items. However, if biology is taken as leading to mutability, the relationship between attitudes and the assimilation of evidence may be very different. As several critics have noted, biological claims about sexual orientation are vulnerable to reinterpretations as efforts to generate new means of changing sexual orientations (e.g., Fausto-Sterling, 1992). More generally, for both theoretical and practical reasons future research in this area should explore both a wider range of sexual orientation beliefs and investigate bi-directional effects between beliefs and attitudes, and beliefs and new arguments. We hope the present research will prove to be a first step in this direction.

Notes

1. Item 17 of the ATLG was modified. In Herek (1994) this item read “I would *not* be too upset if I learned that my son were a homosexual.” Because of the respondent’s age in the present study, we changed this item to read “I would *not* be too upset if I learned that a close family member was a gay man.
2. Significance levels refer to two-tailed tests except where noted.
3. Eight respondents did not respond to one or more belief items. Consequently the total number of participants included in analyses involving belief items is sometimes less than 116.

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Appendix

Here is a short report of a scientific study from the newspaper. Read through the study as carefully as you can and answer the questions below. You may refer back to the study and re-read parts of it while you are answering these questions. There are no right or wrong answers to these items, but we are interested in your true impressions of the study.

Study Links Gay Sons to Birth Order

Religious leaders, political figures and psychotherapists have long debated--often in purely emotional terms--the difficult issue of sexual orientation. Do some people choose to be homosexual, or is there a deeper underlying biological reason for this behavior? A new study by Harvard biologists linking homosexuality to birth order suggests that the latter answer to this question might be the one borne out by scientific research. The research team contacted over 500 exclusively gay men, recruited through various gay organizations and publications. A matched sample of 500 heterosexual men was also included for comparison. Because this study was the first of its kind, only men who were exclusively "gay" or "straight," rather than "bisexual," were included in the study. In addition to in-depth questioning about their own sexual behavior, the homosexual and heterosexual men were asked about their family structure. The results? Firstly, the homosexual men were more likely to be born later in the family than the heterosexual men. Secondly, the study found that even in large families, gay sons were more likely to be born to older mothers. In general, gay babies are born to women in their later forties, who have usually had one or more previous children. For example, in one family a mother gave birth to three sons after her fortieth birthday and two of the three brothers were gay.

“While this study is a great breakthrough, further research is clearly needed in this area,” said Dr. Zillstein, the head of the Harvard research team. “We are working with the hypothesis that hormonal influences on sexual orientation operate before birth. Older mothers often have damaged immune systems, particularly if they have endured previous pregnancies and this may lead to the hormonal balance responsible for homosexuality.” Zillstein also noted that his study was limited in that it only examined male homosexuality and ignored lesbians. He also acknowledged that other influences, such as genetics, could play a role in determining sexual orientation.

Please indicate your opinions of this study by rating the statements below on a scale from 1 (strongly disagree) to 7 (strongly agree).

1. This study was adequately carried out.
2. Because this is the first study in the area, we cannot be confident of the results.
3. Dr. Zillstein should be given an award for his scientific work.
4. If I were a biologist looking to hire a research assistant, I would like to hire someone who had worked on this project.
5. This study helps us to understand why some people are attracted to members of one sex rather than the other.
6. This research is of fundamental importance to biology.
7. This research team should be funded so that they can extend their work.
8. This study gives vital new information to the public.
9. Harvard should support a project by this team to study lesbians and birth order.
10. Political pressure should be brought to bear to discourage this kind of scientific work.

Table1. Correlations Between Sexual Orientation Belief Items and ATLG and Item Loadings on Immutability and Fundamentality Factors.

Belief Item	Factor loadings		
	rATLG	IMM	FUN
1. Sexual orientation is caused by biological factors such as genes and hormones	-.30**	+.77	
2. Whether a person is homosexual or heterosexual is pretty much set early on in childhood	-.20*	+.82	
3. If you didn't know a person's sexual orientation you couldn't really say that you know that person	-.09	+.35	+.44
4. Homosexual relationships are fundamentally different from heterosexual relationships	+.52**		+.74
5. Regardless of their past experience some people can choose to change their sexual orientation	+.18	-.41	
6. Doctors and psychologists can help people change their sexual orientation	+.49**	-.47	+.61
7. If someone comes out as gay or lesbian they were probably attracted to the same sex all along	-.27**	-.67	
8. Bisexual people are fooling themselves and should make up their minds	+.51**		+.66
9. In all cultures there are people who consider themselves homosexual	-.18		-.42

*p < .05, **p < .01 for test of |r| > 0.

IMM = Immutability factor, FUN = Fundamentality beliefs factor.