The influence of open and closed attitudes on the reception of scientific evidence of genetic predisposition to homosexuality

Stephen Jeffers
THE INFLUENCE OF OPEN AND CLOSED ATTITUDES ON THE RECEPTION OF SCIENTIFIC EVIDENCE OF GENETIC PREDISPOSITION TO HOMOSEXUALITY

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

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by
Stephen Jeffers
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ABSTRACT

The study examined attitudes toward homosexuals from a neo-functional perspective, including a proposal that these attitudes are primarily 'open' and informationally based, or primarily 'closed' and affectively based. Scientific evidence of a genetic predisposition to homosexuality should be differentially received, based on the attitudes of the recipients of the information. Participants were 231 college students (57 males and 174 females) who were administered a 3-part survey comprising a pre-test, a stimulus presentation, and a post-test assessing the impact of the information. The two 8-item pre-measure scales were developed to assess Open-Informational and Closed-Affective attitudes. The KATH Homonegativity scale was also administered. A set of 12-item post-measure scales was developed to assess reception of the information in three areas: perceived credibility of the information; personal effectiveness; and predicted social effectiveness. Two published articles outlining recent scientific findings suggesting a genetic basis for homosexuality were presented to the participants. Results of correlational analyses supported the hypotheses. Those with more open informationally-based attitudes and less closed affectively-based attitudes viewed the scientific findings as more credible, were more likely to view homosexuals more favorably after receiving it, and predicted society as a
whole would act more positively toward homosexuals in the future than those with less open-informational and more closed-affective attitudes. Multiple regression analyses indicated that open-informational attitude and closed-affective attitude scores both contributed significantly to predictions of credibility and personal effectiveness, although the variance accounted for in social effectiveness was substantially lower, and only open-informational attitude contributed significantly to social effectiveness. The effects of religiosity, gender, and fundamentalist affiliation were also examined. The results suggest that a bi-dimensional approach, incorporating both open and closed attitudes, might be more effective than a uni-dimensional scale in assessing attitudes toward homosexuality. Further, the impact of information about the genetic causation of homosexuality depends on the pre-existing attitudes of the recipients of the information.
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INTRODUCTION

The last two decades have seen an unprecedented increase in research on homosexuality and concomitantly on anti-homosexual attitudes. Certain factors have consistently been shown to be reliable predictors of a negative attitude toward homosexuals. Such feelings are much more prevalent in males (Kite, 1984; Morin & Garfinkle, 1978; Pratte, 1993), older adults, and those with lower levels of education (Herek, 1984). In fact a higher level of education has shown to be one of the strongest predictors of tolerance toward homosexuals (West, 1977). This identification of education as a predictor of tolerance concurs with earlier studies of social and political diversity. These studies suggested that increased tolerance in general is a direct consequence of the wider exposure to divergent attitudes afforded in the educational system (Stouffer, 1955).

Studies of anti-homosexual attitudes among college students (Kurde, 1988) and 15-19 year-olds (Marsiglio, 1993) support the premise that the younger the student the more negative the attitude, particularly among those with the poorest academic performances, where negative attitudes were found to be strongest of all. Religiosity and church attendance, especially among Christian Fundamentalists, are also consistently shown to be powerful predictors of intolerance in general (Altemeyer & Hunsberger, 1992; Lenski, 1963; Stouffer, 1955), and homonegativity in
particular (Herek, 1984; Kirkpatrick, 1993; Maret, 1984, West, 1977). VanderStoep and Green (1988) argue, however, that anti-homosexual attitudes among Fundamentalists and some Orthodox Christians stem not simply from blind adherence to religious teaching, or irrational fears, but rather are the product of an underlying ethical conservatism, which forms the intervening variable between religiosity and homonegativity. This representation of homonegativity as a part of a greater belief system offers it as much more a product of a secularly forged conservatism, embodying both a commitment to social order and normality (Kurdek, 1988), and an intrinsic need for strong conventionality and secure traditional sex roles (Bendet, 1986). Stark (1991) and Whitley (1987) conclude that this commitment to traditional sex roles relates highly to anti-homosexual attitudes in males, while Kerns and Fine (1993) argue that it is gender role attitude, rather then mere gender, that actually mediates the relation between gender and the level of anti-homosexual attitude.

While specific factors such as age, education, gender, religiosity, and sex-role conservatism are clear predictors of anti-homosexual attitudes, it is the actual attribution of the causes of homosexuality that has recently emerged as a powerful mediating factor in determining the degree of negativity. Ernulf, Innala and Whitam (1989) showed that subjects who believe homosexuals are "born that way" held
much more positive attitudes toward them than those who believe they "chose to be that way." Aguero, Bloch, and Byrne (1984) contend that the belief that homosexuality is chosen is a primary factor determining the negative response, with the most intensely negative feelings held by those who believe homosexuality is determined by learning and personal choice. Such negative feelings are comprehensible, according to earlier authors (Allgeier & Allgeier, 1988; Bell, Weinberg, & Hammersmith, 1981) because such a belief system holds a chosen sexual deviancy to be particularly threatening, since it might be "caught" or passed along by familiarity or proximity. Whitley (1990) substantiated this perspective, adding that same-sex attraction was viewed with even stronger negativity by those who saw it as controllable. From this perspective homosexuality was interpreted as a highly threatening role willfully and willingly adopted by the deviant.

But whereas attribution is now being studied explicitly as a factor contributing to attitudes towards homosexuals, it is worth noting that it has enjoyed a degree of implicit influence in much of the objective research undertaken on the subject. In some studies, when questions were posed to participants in supposedly "non-heterosexist" terms, a distinct "choice" bias was implied in the wording used by the researchers. For instance, in Hansen’s (1982) survey, one question reads: "Homosexuals are just like everyone
else. They simply chose an alternative lifestyle." It is worth pointing out, too, that even today the widespread use among researchers of the term "sexual preference" in itself suggests a degree of optionality, whereby the individual has a choice of conditions, but simply prefers, and consequently adopts, homosexuality.

Belief that perceived choice is a determinant of homonegativity is fully consistent with Weiner's (1986) Attribution Theory. It maintains that any positive outcomes seen as being under the control of the individual tend to elicit a positive response, while negative outcomes seen as being under individual control elicit a negative response. Consequently, if a homosexual man is believed to be responsible for his own deviancy, then he will be viewed much more harshly. Such predictions are consistent with studies of other socially stigmatizing conditions, such as obesity (Crandall, 1994; Crocker, Cornwell & Major, 1993; DeJong, 1980), physical defects (Rodin, Price, Sanchez & McElligot, 1989), disease (Schwarzer and Weiner, 1991), alcoholism (Rivers, Sarana & Anagnostopoulos, 1986), and AIDS (Anderson, 1992; Collins 1994). These all suggest that if a condition is perceived as controllable, then the stigmatized individual will be viewed negatively, and is more likely to be blamed for his condition.

In a study assessing perceived responsibility in certain specific stigmatized conditions, Weiner, Perry &
Magnusson (1988) found that of nine conditions examined, participants gave their lowest personal responsibility ratings for Alzheimer’s, blindness, and cancer, while those with AIDS, child abusers, and the obese were judged at highest responsibility. The researchers concluded that respondents tended to hold individuals far less responsible for a biologically based problem than they did for those conditions they perceived to be behaviorally caused. Such a biological/behavioral distinction is clearly also fundamental in assessing level of blame in attitudes toward homosexuality.

Weiner and his colleagues revisited the issue of controllability and stigma in the wake of Earvin "Magic" Johnson’s public declaration of his HIV seropositivity (Graham, Weiner, Giuliano, & Williams, 1993). The exact means by which the athlete contracted the virus was - and still is - unknown, and by presenting subjects with five possible causes of exposure, the researchers set out to look at variations in responsibility judgments accounted for by each suggested means of transmission (i.e. blood transfusion, conventional non-promiscuous sexual behavior, promiscuous heterosexual sex, homosexual sex, and intravenous drug abuse). Results showed that implied responsibility was directly related to the imagined method of exposure, and that sympathy for the victim was in inverse proportion to the perceived blameability of the proposed
method of contraction. They also found that the affective reaction ratings (sympathy minus anger) dropped most sharply when the cause of the HIV exposure was proposed as homosexual sex or drug use - the two conditions perceived to be most behaviorally incurred and, consequently, the two deemed most worthy of blame.

In a later overview of the issue, Weiner (1995) stresses that responsibility assignment requires actual human involvement - and implicit choice - whereas causal judgments do not. He adds that inferences about an individual's responsibility for his own condition necessitate both internal and controllable causality. So a perceived conscious choice about sexual orientation and behavior would induce responsibility assignment, whereas an uncontrollable, biological causation inferring no choice, would not. Interestingly, he maintains, too, that an inference of responsibility also generates anger and a potential for action against the individual, and that "blame" stems from a firmly perceived responsibility with a deeper emotional component. By extension, this then offers a heightened potential for more direct action against that "blamed" individual. If "responsibility" is affectively neutral, "blame" is always negative. Such a line of reasoning, stressing the interaction of a deeper affective involvement with stronger assignment of responsibility, and a resultant potential for anger and negative action, offers
an interesting perspective from which to look at the
development of extreme homonegative behaviors and anti-gay
violence.

Recent research indicates that sexual orientation is
not, however, a matter of choice, but may in large part be
biologically differentiated and genetically predetermined.
While interest in finding a biological cause of
homosexuality has been present since the 1940s, the new
investigative vigor is producing compelling results. The
widespread popularity of biologically-based research
effectively only dates back to LeVay's (1991) landmark
discovery of a significant difference in the brains of
homosexual and heterosexual men. Previously, however, Swaab
and Hofman (1990) had shown that the suprachiasmatic nuclei
of the anterior hypothalamus were almost twice as large in
the brains of homosexuals as in those of heterosexuals
(although it remains uncertain how that particular section
of the brain - known to govern circadian rhythms - might
affect sexuality).

LeVay instead focused on the area of the hypothalamus
that is known to affect sexual behavior. In post mortem
examinations he found that the cluster of cells in the 3rd
interstitial nuclei (INAH 3) of the anterior hypothalamus
were smaller in the homosexual subjects than the
heterosexuals. Conjecture about actual biological
differences had always been rife, and now for the first time
someone had identified a specific anatomical difference between homosexual and heterosexual men. Allen and Gorski (1992), who had earlier identified the four discrete groups of neurons (INAH 1, 2, 3 and 4) that led LeVay towards his discovery, later identified similar differences in the anterior commissure of the neocortex, adjacent to the hypothalamus. The significance of this particular distinction, affecting a fiber bundle not related to sexuality, is still under debate.

While LeVay’s discovery provoked some controversy, especially since his research was on a small sample of males who had all died of AIDS-related illnesses, it nonetheless precipitated an energetic effort to identify more about potential physiological differences. For instance Hal and Kimura (1994) studied the dermal ridges on the fingertips of homosexual and heterosexual men. They found 30% of the homosexual men showed more ridges on the left hand than on the right (unlike most heterosexual men, who have more ridges on their right hands). And while it was never suggested that fingerprints are connected to sexual development, their formation nonetheless relates to genetic predisposition, since dermal ridges are fully formed in utero by the 16th week, and remain unchanged throughout the life span. Since the anterior commissure also develops around the same time, it provides an interesting link to the earlier, still unexplained findings of Allen and Gorski.
Some current research has even indicated that actual birth order may play a contributory role in the development of male homosexuality (Blanchard, Zucker, Bradley & Hume, 1995; Zucker & Blanchard, 1994).

While the identification of these physiological differences had a striking impact on research, these findings only provided a manifestation of suggested differences between homo- and heterosexual men. It was the contribution of the genetic researchers that offered the potential to explain the cause of these differences. Hamer, Hu, Magnusson, Hu, and Pattatucci (1993), working for the National Institutes of Health, analyzed 114 families of homosexual men in order to determine if male sexual orientation is genetically influenced. A pedigree analysis identified a 13.5% chance of a homosexual man having a self-identified, exclusively homosexual brother (as against a stringently defined 2% of the general male population who they project as being self-identified, and exclusively homosexual). Significantly higher rates of probability were also identified in maternal uncles and the sons of maternal aunts. But the most striking evidence came from the DNA linkage studies undertaken to examine transmission through the maternal line. By a complex process of segmenting "arms" of the chromosomes with marker enzymes, they detected a shared marker for homosexuality on the distal portion of the Xq28 chromosome. Of the 40 pairs of homosexual brothers
studied in the analysis, 33 pairs were fully concordant, meaning they both shared in exactly the same DNA marker at the same point. This represented, in effect, an 83% concordance on a gene inherited from the mother.

The same researchers' follow-up study (Hu et al., 1995) focused specifically on the X chromosome and was expanded to include a larger number of families and lesbian siblings. But while confirming earlier findings regarding male homosexuality, they were unable to identify similar linkage for females, concluding that there is a distinction between male and female homosexual development.

Turner's (1995) subsequent analysis confirmed the transmission through the maternal line on the Xq28 site, while a comprehensive twin study undertaken by Whitam, Diamond, & Martin (1993) identified a concordance rate of 66% (monozygotic) and 30% (dizygotic) for self-identified, exclusive male homosexuality.

So if there is powerful evidence showing homosexuality to be biologically determined, is any change in attitude likely? Logically those who believe homosexuality is a choice might be swayed to reconsider given this new information. Others, for whom the attribution of homosexuality is subordinate to much more deeply-rooted negative feelings, might be far less inclined to change their views. Therefore the extent to which an attitude is susceptible to new information must be dictated in large
part by the nature of the attitude itself. The functional approach to attitude formation and maintenance (Katz, 1960) held that attitudes provide strong psychological benefits to those who hold them, and should be looked at in terms of the psychological functions they serve. These include a "knowledge" function, which serves to bring order and clarity to the individual's personal environment; an "instrumental" (or utility) function, to maximize the positive while minimizing the negative outcomes within that environment; and an "ego-defense" function, that offers a strategy for diminishing or evading intra-psychically based anxiety. This approach also proposes a "value-expressive" function, which serves to express and reinforce values which are integral to the individual's own self-identity and sense of belonging.

Herek (1986) advocates a re-examination of the functional approach in looking at attitudes toward homosexuality, but from a contemporary perspective that addresses the innate empirical weaknesses of the original approach. (It lost favor in the first place largely because it was viewed as offering no methodological means of assessing function and, consequently, no experimental validation). Herek (1986), by developing a procedure that specifically addressed attitudes through subjects' explanation, proposes a neofunctional theory that suggests all attitudes are essentially instrumental, since they all
serve to benefit the individual in some particular way. He divides attitude functions into two categories to differentiate between the types of benefit incurred, labeling them "Evaluative" and "Expressive". "Evaluative" functions closely parallel the "instrumental" function of the earlier approach. These serve primarily as goals in themselves, offering direct benefit to the subject's self-interest through organization, categorization, and prediction within his environment. These "Evaluative" functions are based upon past experience, from which the attitude object is then evaluated in terms of likely positive or negative future outcomes. An "experiential-specific" attitude, would evaluate a specific member of a group or category from personal experience, seeing him as unique and unrepresentative of the broader category. Within this framework, a positive experience with a homosexual would remain discrete, and would not be seen as entree to a more positive attitude toward homosexuals in general.

An "experiential-schematic" attitude, on the other hand, serves to evaluate the broader category from an individual experience, using personal experience to forge a cognitive schema with which to project future interaction. Under such circumstances a positive experience with a homosexual colleague or family member is likely to facilitate a more positive attitude toward other homosexuals in the future.
The third evaluative sub-category is "anticipatory-­evaluative," which projects positive or negative future interaction from expectations rather than experience. Such an attitude function operates largely from preconceptions and perceptions, and is unlikely to be susceptible to any change, since strong projections frequently define actual experience even before it occurs. If we are strongly predisposed to view someone negatively before any interaction, then it is much more likely we will tailor that first personal experience to fit our prior expectations. If a mere 30% of Americans know an openly gay person, then it can be assumed that the remaining 70%, who have no personal experience at all, hold attitudes that serve this 'anticipatory' function.

Herek's second category is "Expressive," whereby typical symbolic attitudes function not to provide a direct utility, but to provide a means to an end by fortifying the individual's own self worth, self-concept, and identity. Under this classification he offers three subsets. The "social-expressive" function reinforces social acceptance and belonging, while the "value-expressive" function confirms the values critical for the determination of in-group identification. These two subsets most closely acknowledge the "value-expressive" function of Katz's (1960) earlier approach. The "defensive" function, echoing the original "ego-defense" function, serves to ease anxiety.
resultant from unresolved intra-psychic conflicts. (It has long been argued that some of the strongest anti-gay violence is perpetrated by such men attempting to resolve unconscious fears about their own homosexuality.)

As Herek's (1987) subsequent research points out, heterosexual attitudes toward homosexuals appear to serve primarily these expressive functions. The homosexual is seen as both a symbol of abnormality and unacceptibility and an individual representation of values that directly contradict those of the important reference group. But while Herek's work focuses primarily on anti-homosexual attitudes and "heterosexism," as he puts it, his neofunctional approach offers a promising perspective from which to look at broader attitudes about homosexuality, and specifically the degree to which this approach might help identify the likely impact of new scientific information on these attitudes.

According to Herek, attitudes about homosexuals are almost entirely affectively-driven, and hence predominantly negative. Of all his proposed attitude functions, only the "evaluative-schematic" function suggests a more informationally-based cognitive component. But we are currently moving through a unique period in history where knowledge, communication, and information are driving forces. So as we move through this "information age," it can be argued that attitudes themselves may be evolving, developing characteristics and components assimilated from
the evolving culture itself. Consequently some attitudes may be developing much more salient cognitive functions as information, communication, and high technology continue to redefine the culture of the new era. Such an information-based function would be very much concordant with Katz's original proposal of a "knowledge" function, largely neglected by Herek in his re-examination. So in following Herek's neofunctional lead, I propose that it be expanded in this particular study to acknowledge a potential "informational" function in current attitudes towards sexual orientation. Attitudes toward homosexuals, therefore, are seen from this perspective as being affectively-based, and closed, or informationally-based, and open. As such these attitudes may be differentially susceptible to new information and rational argument. The effectiveness of the new information would then be largely dependant on where the individual attitude falls on the affective/informational continuum. Affective-based attitudes are here defined as attitudes driven by feelings about the attitude object, whereas the more cognitive informationally-based attitudes are defined as attitudes driven by thoughts about the attitude object (Eagly & Chaiken, 1993). For the purpose of this study affectively-based, closed attitudes will be referred to as "Closed-Affective" and informationally-based, open attitudes will be referred to as "Open-Informational."
There is already a solid body of research in support of the cognitive-affective distinction in attitude formation and maintenance (Breckler, 1984; Breckler and Wiggins, 1989; Tessar and Schaffer, 1990; Woodmansee and Cook, 1967; Zajonc, 1984). However, research into the susceptibility of attitude types to specific messages is relatively new, fueled largely by corporate America's need to reach more consumers more effectively with more products. Consequently what research there is addressing the cognitive/affective issues in attitude susceptibility tends to focus on persuasion and the testing of induced attitudes toward consumer products. Results thus far have been sketchy, ambiguous, and confusing. For instance, Edwards (1990) found that affect-based attitudes were more vulnerable to affective persuasion, and that cognition-based attitudes showed equal susceptibility to both cognitive and affective persuasion. Millar and Millar (1990), however, in a study involving attitudes toward beverages, showed that affective-based attitudes were more susceptible to rational argument. All of these researchers agree, however, that despite early ambiguities, this is fertile ground for further study and warrants much more attention in the future.

Researchers (e.g. Black & Stevenson, 1984; Millham, San Miguel, & Kellogg, 1976; Smith, 1971; Smith, Resick, & Kilpatrick, 1980; Weinberger & Millham, 1979) have previously attempted to examine the cognitive/affective
distinctions in attitudes toward homosexuality, but these efforts have generally been directed toward the assessment of homonegativity (or homophobia), rather than the assessment of attitudes toward homosexuals in general. Furthermore, earlier use of supposedly cognitive items in research is highly questionable, given that the questions posed tended to be cognitively framed representations of a primarily affectively-driven, irrational belief e.g.
"...homosexuals should be locked up to protect society" (Smith, 1971).

The issue of informational argument and attitudes toward homosexuality clearly requires a different slant. The original functional argument offers a more positive and relevant approach. It suggests that in order to modify an attitude, the type of message should be matched to the functional "type" of the attitude. For instance, if the attitude provided a strong social-expressive function, then the message should be aimed at connecting with the individual's strong need for acceptance and recognition. For example, a student whose sense of identity is strongly bound up with membership in an exclusive fraternity is unlikely to soften his attitude toward homosexuals unless the message effectively relates to the fraternity itself and his inclusion in it. His attitude is likely to be most resistant to any new information couched in strictly cognitive or evaluative terms.
Research directly examining the effects on attitude of scientific evidence of a biological causation of homosexuality is scant at best. In the only study thus far to focus specifically on this issue, Piskur and Degelman (1992) showed a group of students a written summary of research to-date that supported the biological determination of homosexuality. Other students were shown information arguing against it, while a control group was shown nothing. Subsequent testing of attitudes toward homosexuality showed only that subjects who read the summary favoring biological causation were less negative than those who read the summary that was unfavorable, but they found no significant differences in measured attitudes between those who had read the favorable information and those in the control group who had read no information. Furthermore, for the male subjects, they found no significant effect for the information between any of the conditions. They did find, predictably, that female students tested more positively in their attitudes than males.  

Since that study was undertaken, scientific evidence of biological predisposition has become much stronger and more compelling than the cursory outline offered those participants. Furthermore, Piskur and Degelman’s (1992) research was potentially confounded by the religiosity variable, since the study was undertaken at a church-affiliated school. And while acknowledging that subjects’
religious beliefs might be critical in the processing of this new information, the researchers made no attempt at addressing general underlying attitude types held by the participants in their study.

The focus of the proposed study is the "Open-Informational" and "Closed-Affective" components of attitudes toward homosexuals, and how each may affect the response to scientific evidence of biological determination. Attitudes comprise both affective and cognitive components, and standardized measures of attitudes toward homosexuals generally make no specific distinction between the two in presenting their items (Hansen, 1982; Kite & Deaux, 1986). However, while attitudes toward homosexuals cannot be viewed simply as either open or closed, they can be seen as existing along inter-related continuua, being primarily informationally-based and open, or primarily affectively-based and closed.

The hypotheses are:

1) Perceived Credibility of the Information:

a) Higher positive "Open-Informational" attitudes toward homosexuals will be associated with higher perceived credibility of information indicating a biological causation of homosexuality.

b) Higher negative "Closed-Affective" attitudes toward homosexuals will be associated with lower perceived
credibility of information indicating biological causation.

c) "Closed-Affective" components of attitudes toward homosexuals will account for more variance in these credibility responses than "Open-Informational" components:

2) Effectiveness of the Information:

a) After receiving this information, those with more positive "Open-Informational" attitudes will be more likely to change their opinions and behaviors in favor of homosexuals.

b) After receiving this information, those with more negative "Closed-Affective" attitudes will be less likely to change their opinions and behaviors in favor of homosexuals.

c) "Closed-Affective" components of attitudes toward homosexuals will account for more variance in these effectiveness responses than "Open-Informational".

3) Societal response:

a) Those with more positive "Open-Informational" attitudes toward homosexuals will be more likely to expect this information to lead to a positive response toward homosexuals by society at large.

b) Those with more negative "Closed-Affective" attitudes toward homosexuals will be less likely to
expect this information to lead to a positive response by society at large.

c) "Closed-Affective" components in attitude toward homosexuals will account for more variance in these societal expectation responses than "Open-Informational" components.

4) Homonegativity:

a) Higher homonegativity will predict a lower credibility response to the information, less likelihood of a more positive personal change in opinions and behaviors, and lower expectation of a positive change in society at large.

b) Higher positive "Open-Informational" attitudes toward homosexuals will be associated with lower homonegativity.

c) Higher negative "Closed-Affective" attitudes toward homosexuals will be associated with higher homonegativity.

Additional questions addressing related issues, such as genetic testing and pregnancy termination, will also be asked as a basis for future study.

1: Pilot Study

A pilot study was undertaken to determine which items should be included in the Pre-Test scales. A set of 22 survey statements was generated to reflect attitudes that indicated an openness to new information about homosexuality
("Open-Informational"), and attitudes that indicated an affectively-based, rigid resistance to any new information ("Closed-Affective").

A two-part questionnaire was used. In the first section participants were asked age, gender, ethnicity. They were also asked to identify their sexual orientation as exclusively heterosexual, mostly heterosexual, bisexual, mostly homosexual, or exclusively homosexual. In the second section the participants were presented with the 22 item statements and asked to respond on a 5-point Likert-type scale from Strongly Disagree (1) to Strongly Agree (5). Three items were reverse scored to account for the possibility of a response set.

Initial participants were male (n = 49) and female (n = 93) first- and second-year psychology students at California State University, San Bernardino, who participated for extra credit in their course work. Participants' ages ranged from 17 to 62, with a mean age of 24.8 years. Three participants were self-identified as mostly or exclusively homosexual and their responses were excluded from the study. Of the remaining 139 participants, ethnicity was 46.8 % White (n = 65); 23.7 % Hispanic (n = 33); 11.5% Black (n = 16); 10.1% Asian (n = 14); 0.7% Native American (n = 1); and 7.2% Other (n = 10). This study sample exceeded the size deemed acceptable for this type of analysis (Tabachnik & Fidell, 1989.)
A principal-axis factor analysis with orthogonal Varimax rotation was performed on the 22 generated items to determine which items best measured the two predictor variables to be used in the major study. A screening for univariate and multivariate outliers was conducted. All items were within acceptable range for meeting the assumptions of normality and linearity, and none approached significant singularity or multicollinearity. Outliers were tested for and none was identified. Finally the Kaiser-Meyer-Olkin measure indicated an acceptable level of sampling adequacy (.88).

Using the criterion of an Eigenvalue of 1, an unforced factoring extraction (N = 139) performed on the 22 items produced a 5-factor solution, which accounted for 64.1% of total variance. Further examination showed that three factors accounted for 52.3% of total variance. A forced 3-factor extraction was then executed, which indicated that only five of the original items did not load on any factor. Eight items loaded onto Factor 1, representing an "Open-informational" attitude toward homosexuals. Six items loaded onto Factor 2, representing a "Closed-affective" attitude toward homosexuals. The three items loading on Factor 3 shared a common content, reflecting the individual's belief in effective self-reporting of attitudes. However, because the content reflected in Factor 3 was not directly related to attitudes toward homosexuals, it was seen as irrelevant.
<table>
<thead>
<tr>
<th>Item</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colleges should offer more opportunities for open discussion of homosexuality.</td>
<td>.74 (-.21) (.14)</td>
</tr>
<tr>
<td>I would be interested in talking to a homosexual about his opinions and feelings.</td>
<td>.72 (-.20) (.07)</td>
</tr>
<tr>
<td>If I were reading a favorite magazine and came across an article about homosexuality, I would probably take the time to read it.</td>
<td>.70 (-.29) (.05)</td>
</tr>
<tr>
<td>It is important for society to learn more about homosexuality.</td>
<td>.69 (-.31) (.24)</td>
</tr>
<tr>
<td>Learning more about homosexuality will help me better understand the problems facing gays.</td>
<td>.61 (-.07) (-.03)</td>
</tr>
<tr>
<td>Homosexuality is an appropriate subject for research.</td>
<td>.53 (-.31) (.47)</td>
</tr>
<tr>
<td>I could discuss homosexuality rationally with my friends.</td>
<td>.51 (-.07) (.27)</td>
</tr>
<tr>
<td>More research into homosexuality would be a waste of time and money.*</td>
<td>.45 (-.35) (.41)</td>
</tr>
</tbody>
</table>
Table 1 (cont.)

I know in my heart that homosexuality
is wrong. (-.29) .69 (-.23)
If I see a scene between two homosexuals
in a movie I have to look away. (-.28) .68 (-.00)
The thought of two men together
makes me ill. (-.49) .68 (-.14)
Homosexuality is a matter of
morality. (-.05) .68 (-.27)
A TV movie about homosexuals would be
of no interest to me. (-.47) .65 (-.11)
This country would be a lot better off
without homosexuals. (-.33) .58 (-.42)
If I know I’m right about something I
don’t need to listen to any more
information.* (-.09) (.13) .60
I see myself as an open-minded person. (.43) (-.19) .48
If I feel strongly about something
I’m not likely to change my opinion.* (-.07) (.05) .43
*Item was reverse scored
to the current study. See Table 1 for items and loadings on
the three factors.
2: Main Study

Method

Participants

Participants were 174 female and 57 male (N = 231) first-, second-, and third-year psychology students at California State University, San Bernardino, who participated for extra credit in their course work. Six of the original participants (N = 237) were self-identified as mostly or exclusively homosexual and their responses were excluded from the study. Participants' ages ranged from 17 to 62, with a mean age of 26.5 years. Ethnicity was 58.9% White (n = 136); 18.2% Hispanic (n = 42); 7.4% Black (n = 17); 8.2% Asian (n = 19); and 7.4% Other (n = 17). See Table 2 for complete frequencies by demographic variable.

Pre-Measures

The Open Informational Scale. An 8-item scale was developed to assess the degree of openness to information about homosexuality and the consequent potential for increased positivity and toleration in attitudes toward homosexuals. This scale comprised the eight survey items that made up Factor 1 in the pilot study, and demonstrated an internal consistency of alpha = .86.

For this, and all subsequent pre- and post-measures, the items were scored cumulatively on a 7-point Likert-type scale from Strongly Disagree (1) to Strongly Agree (7). Some
Table 2

Survey Population by Demographic Variable

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>136</td>
<td>58.9</td>
</tr>
<tr>
<td>Hispanic</td>
<td>42</td>
<td>18.2</td>
</tr>
<tr>
<td>Asian</td>
<td>19</td>
<td>8.2</td>
</tr>
<tr>
<td>Black</td>
<td>17</td>
<td>7.4</td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>7.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>57</td>
<td>24.7</td>
</tr>
<tr>
<td>Female</td>
<td>174</td>
<td>75.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sexual Orientation</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusively Heterosexual</td>
<td>218</td>
<td>94.4</td>
</tr>
<tr>
<td>Mostly Heterosexual</td>
<td>10</td>
<td>4.3</td>
</tr>
<tr>
<td>Bisexual</td>
<td>3</td>
<td>1.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Religiosity</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Religious</td>
<td>73</td>
<td>31.6</td>
</tr>
<tr>
<td>Somewhat Religious</td>
<td>93</td>
<td>40.3</td>
</tr>
<tr>
<td>Neutral</td>
<td>42</td>
<td>18.2</td>
</tr>
<tr>
<td>Not Very Religious</td>
<td>12</td>
<td>5.2</td>
</tr>
<tr>
<td>Not At All Religious</td>
<td>11</td>
<td>4.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fundamentalist Affiliation</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>27</td>
<td>11.7</td>
</tr>
<tr>
<td>No</td>
<td>204</td>
<td>88.3</td>
</tr>
</tbody>
</table>
Table 2 (cont.)

**Father’s Education**

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Degree</td>
<td>29</td>
<td>12.6</td>
</tr>
<tr>
<td>College Degree</td>
<td>35</td>
<td>15.2</td>
</tr>
<tr>
<td>Some College</td>
<td>71</td>
<td>30.7</td>
</tr>
<tr>
<td>High School Diploma</td>
<td>42</td>
<td>18.2</td>
</tr>
<tr>
<td>Not Finish High School</td>
<td>53</td>
<td>22.9</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>0.4</td>
</tr>
</tbody>
</table>

items were reverse scored to account for the possibility of a response set.

**The Closed Affective Scale.** An 8-item scale was developed to assess the degree of affectively-driven closed attitudes toward homosexuality, reflecting a resistance to any new information that might potentiate a more positive attitude toward homosexuals. This scale comprised the six survey items that made up Factor 2 in the pilot study. To balance out the scales, two additional items were added: "Love between two men is a sin," and "I would stay well clear of an openly gay classmate." A reliability analysis was run on the additional two items to ensure their compatibility with the other items selected for the scale. The final scale demonstrated an internal consistency of alpha = .89.

**The Kite Attitude Toward Homosexuality Scale** (Kite & Deaux, 1986). A 21-item scale, consisting of one factor, was
<table>
<thead>
<tr>
<th>Item</th>
<th>Item-Total Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homosexuality is a trait like left-handedness.</td>
<td>.68</td>
</tr>
<tr>
<td>I do not believe that homosexuality is passed down through a parent.*</td>
<td>.67</td>
</tr>
<tr>
<td>I believe homosexuals choose to be that way.*</td>
<td>.73</td>
</tr>
<tr>
<td>Further genetic studies will tell us more about the causes of homosexuality.</td>
<td>.69</td>
</tr>
<tr>
<td>Homosexuals cannot help who they are.</td>
<td>.78</td>
</tr>
<tr>
<td>This explanation does not convince me homosexuality is biologically caused.*</td>
<td>.76</td>
</tr>
<tr>
<td>A man's homosexuality is inherited from his mother.</td>
<td>.70</td>
</tr>
<tr>
<td>Chromosomes probably determine homosexuality.</td>
<td>.82</td>
</tr>
<tr>
<td>Homosexuals probably want to be different.*</td>
<td>.42</td>
</tr>
<tr>
<td>Genetic science holds the key to sexual orientation.</td>
<td>.75</td>
</tr>
<tr>
<td>If two brothers are gay it's because they made similar lifestyle choices.*</td>
<td>.76</td>
</tr>
<tr>
<td>Studying the cause of homosexuality through DNA is useless.*</td>
<td>.75</td>
</tr>
</tbody>
</table>

Alpha = .93. * Items reverse scored.
developed by Kite and Deaux (1986) to assess negative attitudes toward homosexuality (Homonegativity). This scale has an internal consistency of alpha = .93, and was developed from an initial set of 40 items representing a range of beliefs, attitudes, and concerns about homosexuals, both on the personal level and as a reflection of negative stereotypes. The validity of this scale was demonstrated in a subsequent study in which the author showed that males with highly negative attitudes reacted far more negatively to a perceived homosexual male than those with less negative attitudes, and assessed him in far more negatively stereotypical terms. For the present study two of the original items were dropped due to a low item-total score, leaving a 19-item scale (alpha = .92) (See Appendix A iii.)

Post-Measures

The Credibility Scale. A 12-item scale was developed by the author to assess the credibility of the genetic information presented in the stimulus materials. The item statements were generated to reflect the participant’s acceptance of specific facts and ideas about genetic predisposition to homosexuality, as outlined in the two articles. The scale showed an internal consistency of alpha = .93. (See Table 3 for Item-Total correlations).

The Personal Effectiveness Scale. A 12-item scale was developed by the author to assess the effectiveness of the information, as presented in the stimulus articles, on the
<table>
<thead>
<tr>
<th>Item</th>
<th>Item-Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will become more in favor of equal rights for homosexuals.</td>
<td>.76</td>
</tr>
<tr>
<td>I will be less tolerant of jokes making fun of gays</td>
<td>.50</td>
</tr>
<tr>
<td>I feel I can now make more informed decisions about homosexual issues.</td>
<td>.65</td>
</tr>
<tr>
<td>If a fellow student told me he was gay I would prefer not to be around him.*</td>
<td>.63</td>
</tr>
<tr>
<td>I am now more strongly opposed to job discrimination against gays.</td>
<td>.67</td>
</tr>
<tr>
<td>I feel more positively about legal recognition of gay partnerships.</td>
<td>.69</td>
</tr>
<tr>
<td>I can sympathize more with the problems of people growing up homosexual.</td>
<td>.70</td>
</tr>
<tr>
<td>I’ll be more comfortable talking about homosexuality.</td>
<td>.73</td>
</tr>
<tr>
<td>I will probably be more friendly towards a homosexual co-worker.</td>
<td>.67</td>
</tr>
<tr>
<td>I will be more sympathetic towards homosexuals who want to adopt a child.</td>
<td>.71</td>
</tr>
<tr>
<td>I will be more likely to accept a family member who is gay.</td>
<td>.76</td>
</tr>
</tbody>
</table>
individual's personal views and behaviors. The item statements were generated to reflect an increased level of personal toleration and acceptance of homosexuals after having been presented with the information indicating a genetic predetermination to homosexuality. The scale showed an internal consistency of alpha = .92. (See Table 4 for Item-Total correlations).

**The Social Effectiveness Scale.** A 12-item scale was developed by the author to assess the predicted societal response to the information presented in the stimulus materials. The item statements were generated to reflect the participant's predictions of whether society as a whole will become more tolerant and accepting of homosexuals in future, after being presented with the information indicating a genetic predisposition to homosexuality. The scale showed an internal consistency of alpha = .85. (See Table 5 for Item-Total correlations).

**Demographic Measures**

Religiosity was scored on a 5-point scale ranging from **Not at all Religious** (1) to **Strongly Religious** (5). Father's
<table>
<thead>
<tr>
<th>Item</th>
<th>Item-Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americans will accept this new information about homosexuality.</td>
<td>.52</td>
</tr>
<tr>
<td>People in this country will not accept that homosexuality is genetic.*</td>
<td>.37</td>
</tr>
<tr>
<td>These scientific findings will make people think less negatively about gays.</td>
<td>.67</td>
</tr>
<tr>
<td>People will treat homosexuals with more respect.</td>
<td>.69</td>
</tr>
<tr>
<td>Society will not become more tolerant of homosexuals.*</td>
<td>.40</td>
</tr>
<tr>
<td>People are likely to be more understanding if a friend tells them he is gay.</td>
<td>.45</td>
</tr>
<tr>
<td>This will make Americans less tolerant of job discrimination against gays.</td>
<td>.46</td>
</tr>
<tr>
<td>Parents will feel more comfortable about a teacher who may be gay.</td>
<td>.57</td>
</tr>
<tr>
<td>Most people will not change their attitudes about homosexuals.*</td>
<td>.43</td>
</tr>
<tr>
<td>Families will now find it easier to talk about homosexuality.</td>
<td>.64</td>
</tr>
<tr>
<td>Parents will be more prepared to accept a son who is homosexual.</td>
<td>.65</td>
</tr>
</tbody>
</table>
Young parents will be more aware that their son might grow up to be gay. 

\[ .47 \]

\[ \text{Alpha} = .85. \] * Items reverse scored.

---

education level was scored on a 5-point scale ranging from Not finish High School (1) to Advanced Degree (5). Religious fundamentalist affiliation was scored Yes/No.

**Stimuli**

Two news articles outlining the recent scientific findings indicating a genetic predisposition to homosexuality were presented. The first was a one-page article from "Science News" (Bower, 1993), briefly describing the initial discovery of the "marker" gene on the X chromosome of homosexual men inherited from the mothers (See Appendix B i ). The second was a one-page article from "Time" (Toufexis, 1995) summarizing a more extensive family study, focusing on the X chromosome, whose results strengthened the original findings. (See Appendix B ii).

**Procedure**

The participants were presented with a 4-part questionnaire. The first section consisted of demographic information in which participants were asked age, gender, ethnicity, sexual orientation, religiosity, fundamentalist
affiliation, and father’s education level. In the second section the participants were presented with the 36 item statements comprising the three pre-measure scales, and asked to respond on a 7-point Likert-type scale. Participants were then presented with the stimulus materials, which they were asked to read carefully. In the fourth section participants were presented with the 36 item statements comprising the three post-measure scales and were asked to respond on a 7-point Likert-type scale. Finally six

Table 6
Additional Items
1) If a woman carried the homosexuality gene, it would be wrong to have a child.
2) If a fetus tests positive for the gay gene, the pregnancy should be terminated.
3) Scientists should find a way to change a child’s homosexuality before birth.
4) If a gay gene is identified, testing of all pregnant women should be mandatory.
5) Genetic research will be valuable if it means we can eliminate homosexuality.
6) Abortion should be legal and available if the child will be a homosexual.
additional questions, related to the subject but not directly connected to the study, were also presented as a basis for potential further research (See Table 6 for additional items).

Questionnaires were filled out in a series of eight private, supervised settings following regularly scheduled classes, and were returned upon completion. Participants were given an informed consent form prior to taking the study (See Appendix D), and were assured of the confidentiality of their responses. Following completion of the questionnaires participants were given a debriefing statement (See Appendix E) and thanked for their participation.

Design

Correlational analyses were conducted to measure the relationships between the three pre-measure scales reflecting attitudes towards homosexuals, and the three post-measure scales reflecting the response to information in suggesting a biological predetermination to homosexuality.

Multiple regression analyses were also conducted to measure the relationships between Open-Informational and Closed-Affective attitudes towards homosexuals and the response to information suggesting a biological predetermination. The predictor variables were Open-Informational attitude, and Closed-Affective attitude. The
criterion variables were credibility, personal effectiveness, and societal effectiveness of the information. The demographic variables of religiosity and gender were also entered into the analysis. Post hoc pairwise comparisons were also conducted to examine differences between demographic groups in each of the pre-measure and post-measure scales, and between demographic groups in each of the additional items.

The data were screened to determine that the criteria for analysis were met. Histograms for the variables were assessed to determine normality. Additional screening was conducted utilizing the residuals from the regression analysis. Residual outliers were tested by Mahalanobis' distance, standardized residuals, and Cook's distance, to determine any influential cases. Missing data were re-examined to assess for entry error, and then replaced by mean scores.

The hypotheses were tested using multiple regression analyses and correlation analyses at a critical significance level of \( p < 0.5 \).

Results

The preliminary data screening indicated that the criteria for normality, linearity, and homoscedasticity were met. The initial analysis examined the relationships between the two independent variables developed for this study and the third independent variable of Homonegativity. A high
degree of collinearity between the Closed-Affective Attitude scale and the established Homonegativity scale, \( r = .91, p < .001 \), had been anticipated, since the new scale was developed largely as a more contemporary approach to assessing similar negative attitudes. The Open-Informational Attitude scale also demonstrated a strong correlation with the Homonegativity scale, \( r = -.72, p < .001 \). The correlation coefficient between the Closed-Affective scale and the Open-Informational scale was \( r = -.71, p < .001 \).

Similar analyses were then undertaken to examine the relationships between the three dependent variables. These intercorrelations also showed strength. Credibility correlated with Personal Effectiveness, \( r = .63, p < .001 \), and Social Effectiveness, \( r = .50, p < .001 \). Personal Effectiveness correlated with Social Effectiveness, \( r = .56, p < .001 \). Further examination showed that Credibility correlated significantly more strongly with Personal Effectiveness than with Social Effectiveness, \( t(226) = 2.78, p < .05 \), indicating that the degree of credibility attributed to scientific evidence of a biological causation is more strongly related to personal change in behavior than to predictions of behavioral change in others.

The independent variables were then examined to assess their relationships with the dependent variables and the
Table 7

Means and Standard Deviations of Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closed Affective Attitude</td>
<td>30.24</td>
<td>12.50</td>
<td>8 - 56</td>
</tr>
<tr>
<td>Open Informational Attitude</td>
<td>39.42</td>
<td>9.98</td>
<td>8 - 56</td>
</tr>
<tr>
<td>Homonegativity</td>
<td>61.48</td>
<td>23.69</td>
<td>19 - 133</td>
</tr>
<tr>
<td>Dependent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credibility of Information</td>
<td>48.20</td>
<td>17.05</td>
<td>12 - 84</td>
</tr>
<tr>
<td>Personal Effectiveness</td>
<td>52.63</td>
<td>15.25</td>
<td>12 - 84</td>
</tr>
<tr>
<td>Social Effectiveness</td>
<td>42.20</td>
<td>11.46</td>
<td>12 - 84</td>
</tr>
</tbody>
</table>

demographic variables. Table 7 shows the mean scores and standard deviations for the independent (predictor) variable scales and the dependent (criterion) variable scales. Table 8 presents the correlation coefficients of the independent variables with the dependent variables. Pearson product-moment correlations indicated significant relationships between each of the independent variables and each of the dependent variables. Closed Affective Attitude showed a significant negative correlation with Credibility, Personal Effectiveness, and Social Effectiveness. This relationship indicates that those holding more closed attitudes viewed this biological information as less credible than those with
Table 8
Correlation Coefficients (r) of Independent with Dependent Variables

<table>
<thead>
<tr>
<th>Independent</th>
<th>Credibility</th>
<th>Personal Effectiveness</th>
<th>Social Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed-Affective</td>
<td>-.68***</td>
<td>-.66***</td>
<td>-.30***</td>
</tr>
<tr>
<td>Open-Informational</td>
<td>.55***</td>
<td>.69***</td>
<td>.31***</td>
</tr>
<tr>
<td>Homonegativity</td>
<td>-.64***</td>
<td>-.71***</td>
<td>-.36***</td>
</tr>
</tbody>
</table>

***p < .001

less closed attitudes, and less likely to effect any significant improvement in either their own attitudes toward homosexuals or in the attitudes of society at large. Homonegativity also showed significant correlations with all three criterion variables.

Further tests were conducted to assess the strength of the differences between the correlation coefficients. Closed-Affective Attitude was shown to be significantly more strongly correlated with Credibility than with Social Effectiveness, $t(226) = 2.48$, $p < .05$, and significantly more strongly correlated with Personal Effectiveness than with Social Effectiveness, $t(226) = 8.28$, $p < .05$. Open-Informational Attitude was more strongly correlated with Credibility than with Social Effectiveness, $t(226) = \ldots$
4.14, p < .05, and Open-Informational Attitude was also more strongly correlated with Personal Effectiveness than with Social Effectiveness, t(226) = 8.42, p < .05. Similar tests showed that Homonegativity was more strongly correlated with Credibility than with Social Effectiveness, t(226) = 6.30, p < .05, and more strongly correlated with Personal Effectiveness than with Social Effectiveness, t(226) = 5.92, p < .05. Thus all three predictors were shown to be more strongly related to the perceived credibility of the biological information and the personal response to it, than to the impact the information might be likely to have on others.

Table 9

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Demographic</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>Educ.</td>
<td>Relig.</td>
<td>Fund.</td>
<td>Gender</td>
</tr>
<tr>
<td>Closed-Affective</td>
<td>-.18**</td>
<td>-.09</td>
<td>.40**</td>
<td>.39***</td>
<td>.15*</td>
</tr>
<tr>
<td>Open-Informational</td>
<td>16*</td>
<td>.07</td>
<td>-.16*</td>
<td>-.29***</td>
<td>-.27***</td>
</tr>
<tr>
<td>Homonegativity</td>
<td>-.15*</td>
<td>-.11</td>
<td>.39***</td>
<td>.39***</td>
<td>.18*</td>
</tr>
</tbody>
</table>

* p < .05. ** p < .01. *** p < .001.
Analyses of the relationships between the predictor variables and the demographic variables were also conducted (see Table 9). These analyses showed religiosity to be positively correlated with Closed-Affective Attitude and Homonegativity, and negatively correlated with Open-Informational Attitude. Fundamentalist affiliation also demonstrated significant correlations with all three independent variables. Age correlated positively with Open-Informational Attitude, and negatively with both Closed-Affective Attitude and Homonegativity, indicating that older participants were less closed in attitude, less homonegative, and more open informationally than their younger colleagues. Gender also correlated significantly with all three predictor variables. Men scored higher than women in Closed-Affective attitude and Homonegativity, whereas women scored higher in Open-Informational Attitude.

Similar analyses of the dependent variables with the demographic variables were also performed. Table 10 shows the correlations of the Criterion variables with religiosity and age. Results indicated significant negative correlations between religiosity and Credibility; between religiosity and Personal Effectiveness; and between religiosity and Social Effectiveness. In general, those who are more religious view this genetic information as less credible than those who are less religious. They are also less likely to feel more favorably toward homosexuals because of this information,
Table 10

Correlation Coefficients (r) of Criterion Variables with Religiosity and Age

<table>
<thead>
<tr>
<th>Criterion Demographic</th>
<th>Criterion</th>
<th>Demographic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>Religiosity</td>
</tr>
<tr>
<td>Credibility of Information</td>
<td>.16*</td>
<td>-.32***</td>
</tr>
<tr>
<td>Personal Effectiveness</td>
<td>.00</td>
<td>-.23***</td>
</tr>
<tr>
<td>Social Effectiveness</td>
<td>-.00</td>
<td>-.19**</td>
</tr>
</tbody>
</table>

* p < .05. ** p < .01. *** p < .001.

and are less likely to predict a more positive attitude change in society at large. Religious fundamentalist affiliation was also tested to assess its relationship with all three of the dependent variables. It demonstrated a significant negative correlation with Credibility, \( r = -0.41, p < .001 \); Personal Effectiveness, \( r = -0.35, p < .001 \); and Social Effectiveness, \( r = -0.21, p < .001 \). Since fundamentalist affiliation had shown a significant correlation with religiosity, \( r = 0.28, p < .001 \), a strong relationship between fundamentalism and the criterion variables had been anticipated. Predictably, subjects declaring themselves to have religious fundamentalist affiliation scored significantly lower than non-
fundamentalists on Credibility, Personal Effectiveness, and Social Effectiveness (see Table 11).

<table>
<thead>
<tr>
<th>Fundamentalist Affiliation and Gender</th>
<th>Gender</th>
<th>t</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criterion</td>
<td>Yes</td>
<td>No</td>
<td>Male</td>
</tr>
<tr>
<td>Credibility</td>
<td>28.92</td>
<td>50.73</td>
<td>44.48</td>
</tr>
<tr>
<td></td>
<td>(12.34)</td>
<td>(15.98)</td>
<td>(16.08)</td>
</tr>
<tr>
<td>Personal Effectiveness</td>
<td>37.77</td>
<td>54.79</td>
<td>47.22</td>
</tr>
<tr>
<td></td>
<td>(13.11)</td>
<td>(14.33)</td>
<td>(14.87)</td>
</tr>
<tr>
<td>Social Effectiveness</td>
<td>35.56</td>
<td>43.16</td>
<td>41.75</td>
</tr>
<tr>
<td></td>
<td>(11.07)</td>
<td>(11.22)</td>
<td>(12.02)</td>
</tr>
</tbody>
</table>

*p < .05. ** p < .01. *** p < .001.

Age showed a positive correlation with Credibility, but no significant relationship with either Personal Effectiveness or Social Effectiveness, and gender differences were found on Personal Effectiveness, with females scoring higher than males. There was, however, no significant relationship demonstrated between gender and Credibility or between gender and Social Effectiveness.
Table 12

Means and SDs for Dependent Variables by Religiosity, Fundamentalist Affiliation, and Gender

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Dependent Personal</th>
<th>Social Effectiveness</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religiosity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly</td>
<td>72</td>
<td>40.93 (17.21)</td>
<td>47.07 (15.50)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>38.42 (11.14)</td>
<td></td>
</tr>
<tr>
<td>Somewhat</td>
<td>93</td>
<td>48.94 (17.55)</td>
<td>54.44 (14.06)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>42.97 (11.26)</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>42</td>
<td>54.29 (12.66)</td>
<td>57.31 (15.78)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48.64 (10.40)</td>
<td></td>
</tr>
<tr>
<td>Not Very</td>
<td>12</td>
<td>55.17 (12.42)</td>
<td>59.92 (13.04)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39.25 (6.50)</td>
<td></td>
</tr>
<tr>
<td>Not At All</td>
<td>9</td>
<td>61.00 (17.06)</td>
<td>51.25 (10.11)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39.89 (13.03)</td>
<td></td>
</tr>
<tr>
<td>Fundamentalist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27</td>
<td>28.92 (12.34)</td>
<td>37.77 (13.11)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35.56 (11.07)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>201</td>
<td>50.73 (16.00)</td>
<td>54.79 (14.33)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>43.16 (11.22)</td>
<td></td>
</tr>
</tbody>
</table>
Table 12 (cont.)

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean1</th>
<th>Mean2</th>
<th>Mean3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>172</td>
<td>49.46</td>
<td>54.59</td>
<td>42.42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(17.07)</td>
<td>(14.89)</td>
<td>(11.28)</td>
</tr>
<tr>
<td>Male</td>
<td>56</td>
<td>44.48</td>
<td>47.22</td>
<td>41.75</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(16.08)</td>
<td>(14.87)</td>
<td>(12.02)</td>
</tr>
</tbody>
</table>

Note. All scales range from 12 - 84. SDs in parentheses.

These findings suggest that older people may find this biological evidence more credible than younger people, while women may be more likely than men to adopt behaviors and attitudes that are more favorable towards homosexuals, after having received the information. (See Table 12 for mean scores on the three criterion variable for the demographic variables). The remaining demographic variables of father’s education and ethnicity showed no significant differences and warranted no further examination.

Prior to the multiple regression analyses, a test was undertaken to detect multivariate outliers. Using a $p < .001$ criterion for Mahalanobis distance (Tabachnik & Fidell, 1989), two multivariate outliers were identified and deleted, leaving 229 cases for analysis. Three sets of standard multiple regressions were performed using SPSS.
Regression. These regressions were performed on Open-Informational Attitude and Closed-Affective as the predictor variables, with Credibility of Information, Personal Effectiveness, and Social Effectiveness as the respective criterion variables. Tables 13, 14, and 15 display the results of these analyses. The tables show the unstandardized regression coefficients (B), the standardized regression coefficients (b), and the t value for each variable entered in the equation. Multiple R, R², and adjusted R² are also listed. In the first analysis, only Closed-Affective attitude contributed significantly to

Table 13

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>b</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed-Affective</td>
<td>-.80</td>
<td>-.58</td>
<td>-8.33***</td>
</tr>
<tr>
<td>Open-Informational</td>
<td>.24</td>
<td>.12</td>
<td>1.99*</td>
</tr>
</tbody>
</table>

Multiple R .69
R Square .48
Adj.R Square .47

Partial Corr. (Open-Informational) .13
(Closed-Affective) -.49

(F =99.18  Sig.F = .0000)

* p < .05.  *** p < .001
### Table 14

**Standard Multiple Regression of Open-Informational and Closed-Affective Attitude on Personal Effectiveness**

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>b</th>
<th>T</th>
<th>Multiple R</th>
<th>R Square</th>
<th>Adj.R Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed-Affective</td>
<td>-.41</td>
<td>-.33</td>
<td>-4.93***</td>
<td>.73</td>
<td>.53</td>
<td>.52</td>
</tr>
<tr>
<td>Open-Informational</td>
<td>.70</td>
<td>.45</td>
<td>6.79***</td>
<td>.53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Partial Corr. (Closed-Affective) = -.33  
(Open-Informational) = .41  

($F = 119.50$, $\text{Sig.F} = .0000$)  

*** $p < .001$

---

### Table 15

**Standard Multiple Regression of Open-Informational and Closed-Affective Attitude on Social Effectiveness**

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>b</th>
<th>T</th>
<th>Multiple R</th>
<th>R Square</th>
<th>Adj.R Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed-Affective</td>
<td>-.14</td>
<td>-.15</td>
<td>-1.76</td>
<td>.33</td>
<td>.11</td>
<td>.10</td>
</tr>
<tr>
<td>Open-Informational</td>
<td>.23</td>
<td>.20</td>
<td>2.24*</td>
<td>.11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Partial Corr. (Closed-Affective) = -.11  
(Open-Informational) = .15  

($F = 13.52$, $\text{Sig.F} = .0000$)  

* $p < .05$
predictions of Credibility. The two variables combined accounted for 47% of the variability. In the second analysis, however, both Closed-Affective attitude and Open-Informational attitude scores made significant contributions towards predicting Personal Effectiveness, together accounting for 53% (52% adjusted) of the variability. For the third analysis it was only Open-Informational Attitude that contributed at all significantly to predictions of Social Effectiveness. Furthermore, the amount of variation contributed was far less substantial, with the two variables combining to predict only 11% (10% adjusted) of the variability.

As a comparison examination, a supplementary regression analysis was conducted using the previously established variable of Homonegativity with Open-Informational Attitude. Results confirmed that the two variables together contributed significantly more in predicting Credibility and Personal Effectiveness, than did Homonegativity alone. In predicting Credibility scores, Homonegativity and Open-Informational Attitude each made significant contributions, accounting for 44.1% of the variance. In predicting Personal Effectiveness scores, Homonegativity and Open-Informational Attitude also made significant contributions, to account for 56.1% of the variance. Only in predicting Social Effectiveness, as in the the earlier analyses, did Open-Informational Attitude not significantly add to the
contribution made by Homonegativity. Furthermore, the combined variance was also markedly lower (only 13.4%).

Additional regression analyses were conducted to examine the contribution of religiosity to the variances in each of the criterion variables. Results indicated that, when added, religiosity made no significant contribution. $R^2$ for Credibility increased from 47.6% to 48.3%; $R^2$ for Personal Effectiveness increased from 52.6% to 52.7%; and $R^2$ for Social Effectiveness increased from 10.7% to 11.4%.

The final analysis examined the relationships between the six additional items and the demographic variables of religiosity, fundamentalist affiliation, and gender. No significant relationship was shown between religiosity and any of the additional items, but $t$ scores indicated an effect for both fundamentalist affiliation and gender on all six items. Comparisons of the means revealed that fundamentalists scored significantly higher than non-fundamentalists on all six additional items. This indicated that, compared to non-fundamentalists, fundamentalists were more in favor of termination of a pregnancy if a child were to be carrying a 'gay' gene, and more in favor of making abortion legal and available in that situation. Fundamentalists also felt more strongly than non-fundamentalists that it would be wrong for a woman to have a child it were likely to be homosexual, and were more in favor of mandatory testing of pregnant women.
Table 16

Means, SDs, and 't' scores for Additional Items by Fundamentalist Affiliation

<table>
<thead>
<tr>
<th>Item</th>
<th>Fundamentalist t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) If a woman carried the homosexuality gene it would be wrong to have a child.</td>
<td>Yes: 3.37, No: 2.07, t = -3.73***</td>
</tr>
<tr>
<td></td>
<td>(2.15) (1.63)</td>
</tr>
<tr>
<td>2) If a fetus tests positive for the gay gene the pregnancy should be terminated.</td>
<td>Yes: 2.30, No: 1.56, t = -2.93**</td>
</tr>
<tr>
<td></td>
<td>(1.84) (1.12)</td>
</tr>
<tr>
<td>3) Scientists should find a way to change a child’s homosexuality before birth.</td>
<td>Yes: 3.26, No: 2.46, t = -2.06**</td>
</tr>
<tr>
<td></td>
<td>(1.99) (1.87)</td>
</tr>
<tr>
<td>4) If a gay gene is identified testing of all pregnant women should be mandatory.</td>
<td>Yes: 3.19, No: 1.86, t = -4.21***</td>
</tr>
<tr>
<td></td>
<td>(1.98) (1.47)</td>
</tr>
<tr>
<td>5) Genetic research will be valuable if it means we can eliminate homosexuality.</td>
<td>Yes: 3.96, No: 2.57, t = -3.47***</td>
</tr>
<tr>
<td></td>
<td>(1.87) (1.96)</td>
</tr>
<tr>
<td>6) Abortion should be legal and available if a child will be a homosexual.</td>
<td>Yes: 2.56, No: 1.64, t = -3.14**</td>
</tr>
<tr>
<td></td>
<td>(2.15) (1.30)</td>
</tr>
</tbody>
</table>

Note. All scores range from 1 - 7. SDs in parentheses.

* p < .05. ** p < .01. *** p < .001.
Table 17
Means, SDs, and 't' scores for Additional Items by Gender

<table>
<thead>
<tr>
<th>Item</th>
<th>Gender</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>1) If a woman carried the homosexuality gene it would be wrong to have a child.</td>
<td>2.77</td>
<td>2.05</td>
</tr>
<tr>
<td></td>
<td>(1.65)</td>
<td>(1.92)</td>
</tr>
<tr>
<td>2) If a fetus tests positive for the gay gene, the pregnancy should be terminated.</td>
<td>2.07</td>
<td>1.51</td>
</tr>
<tr>
<td></td>
<td>(1.49)</td>
<td>(1.13)</td>
</tr>
<tr>
<td>3) Scientists should find a way to change a child's homosexuality before birth.</td>
<td>3.14</td>
<td>2.37</td>
</tr>
<tr>
<td></td>
<td>(1.99)</td>
<td>(1.83)</td>
</tr>
<tr>
<td>4) If a gay gene is identified testing of all pregnant women should be mandatory.</td>
<td>2.41</td>
<td>1.89</td>
</tr>
<tr>
<td></td>
<td>(1.70)</td>
<td>(1.53)</td>
</tr>
<tr>
<td>5) Genetic research will be valuable if it means we can eliminate homosexuality</td>
<td>3.23</td>
<td>2.58</td>
</tr>
<tr>
<td></td>
<td>(2.03)</td>
<td>(1.97)</td>
</tr>
<tr>
<td>6) Abortion should be legal and available if a child will be a homosexual.</td>
<td>2.12</td>
<td>1.62</td>
</tr>
<tr>
<td></td>
<td>(1.56)</td>
<td>(1.40)</td>
</tr>
</tbody>
</table>

Note. All scores range from 1 - 7. SDs in parentheses.
* p < .05. ** p < .01. *** p < .001
Fundamentalists also felt more strongly that scientists should attempt to alter the sexuality of a fetus, and that more genetic research would be of value if it succeeded in eliminating homosexuality. (See Table 16 for mean scores and t values by fundamentalist affiliation). Similar comparison tests for gender revealed that females scored significantly lower than men on all of the additional items. (See Table 17 for mean scores and t values by gender).

Discussion

The focus of the study was two-fold. The first aim was to show that attitudes toward homosexuals could be assessed by examining two distinct components - one closed and more affectively driven, and the other open and more informationally based. In distinguishing the two, the pilot study offered empirical support for that bi-dimensional approach. As expected, each attitude component was discretely measurable, and together they contributed a large proportion of the variance in overall attitudes toward homosexuals. The second aim was to demonstrate that the two attitudes would induce differential responses to scientific evidence indicating that homosexuality was genetically predetermined. Results showed a significant relationship between attitude type and the individual's response to the information. More open informationally based attitudes were associated with greater perceived credibility of the information, more positive personal response, and more
positive predictions of its effect on society as a whole. In contrast, more closed affectively based attitudes were associated with lower credibility of the information, more negative personal response, and more negative predictions of its effect on society.

Participants who scored high on the Closed-Affective scale firmly disbelieved the scientific evidence presented. Despite the biological findings, they did not accept that homosexuality might be genetically predetermined, or that it could be passed down through the female line. Furthermore, they found genetic research into the subject to be largely a waste of time and money. Participants who scored high on the Open-Informational scale, however, tended to believe the information and were in favor of further genetic investigation. The distinction between those with closed attitudes and those with open attitudes was echoed in the participants' responses to how their own behaviors might be affected in the future. Those having strong closed attitudes said that, despite evidence that homosexuality might be biologically based, their actions and feelings toward homosexuals, and their positions on gay issues, would remain generally unchanged. On the other hand, those with more open attitudes said they would probably become even more tolerant and understanding of homosexuals in future, and would be even more sympathetic to current gay issues, such as legal partnerships and job discrimination.
The hypothesis was also supported in the results of the study of the social effectiveness variable, which assessed the extent to which the subjects expected society at large to respond to this new genetic information. As anticipated, those with more closed attitudes tended to believe that Americans would be less likely to accept homosexuality as genetic, while those with more open attitudes thought that a positive change in society would be more likely. Closer examination, however, showed that the strength of the association between attitude type and social effectiveness was markedly lower than the associations with either credibility or personal effectiveness. This relative weakness suggests that those who firmly disbelieved the genetic information, and who said their own behaviors would not change, were not firm in their beliefs about similar responses by society at large. Also, those who readily accepted genetic predetermination themselves, and said they would become even more tolerant in future, did not necessarily believe that the rest of society would do the same.

This particular finding is intriguing from a social psychological perspective, since it directly contradicts "egocentric bias." This concept maintains that people generally assume that others evaluate the world the same way they do, and will, therefore, act in much the same way too. Attributional researchers (e.g. Dawes, 1989; Sabini &
Silver, 1982) have suggested that it is both common and rational to predict others’ responses based upon our own assessments. But the fact that subjects in this study were not convinced that society’s response would be similar to their own, suggests that in this particular area, at least, conventional explanations may be insufficient, and there may be other powerful factors at work.

The results of the regression analyses further underscore the disparity between how subjects gauge their own responses and how they predict the responses of others. Just as attitudinal components contributed strongly to predictions of individual response, both in credibility and personal behavior, those same components contributed far less to subjects’ predictions about society’s response. So, clearly, no matter what our own attitude toward homosexuals, we are uncertain as to how the rest of society might act, and indications are that our own opinions and feelings are much less significant than other factors in making this particular assessment. A general lack of connectedness to society at large might offer a facile explanation as to why we might not expect the rest of the country to feel and act as we do, but such a simplistic explanation appears unlikely. It is possible, however, that some degree of moral distinction might be involved, whereby we view society’s judgments as somewhat inferior to our own. In this vein it has been argued (Sabini, 1992; Sabini & Silver, 1982) that
we often make societal predictions based upon a personalized moral element, and a subject as controversial as homosexuality is likely to offer ample ground for both liberal and conservative views to invoke their own moral positions. Then again, perhaps it is merely the viscerality of the specific subject matter that places it outside conventional diagnosis, and while we view our own convictions as deeply felt, and highly personal, we nonetheless are unwilling, consciously or not, to ascribe them to others.

If there is a moral element, however, it is important to note that morality, in this analysis, is distinct from religiosity. Religiosity was significantly related to all three dependent variables, but beyond the contributions made by Open-Informational and Closed-Affective attitude, religiosity failed to make any further unique contribution to credibility, personal effectiveness or social effectiveness scores. The results of the regression analyses also offered interesting implications as to the relative contributions made by each of the attitudinal components to the three dependent variables examined. These, too, offered support for the argument that responses to homosexual issues might be better assessed by incorporating a bi-dimensional approach. For instance, the results of the credibility analysis indicate that both closed attitude and open attitude contribute significantly and independently.
Therefore, in order to predict credibility more accurately, it might be valuable to examine both attitude scores together. The personal effectiveness analysis indicated an even stronger contribution by each factor. Only in the social effectiveness analysis, where the overall relationship was much weaker and the combined effect much smaller, did only one of the predictors—open attitude—offer any significant contribution. Consequently, instruments incorporating this component might prove more effective than some conventional homonegativity scales in specifically assessing social expectations connected to homosexuality, especially since earlier homonegativity scales have traditionally focused on the negative, affective elements of attitudes toward homosexuality. Moreover, the significant contribution made here by the open attitude score infers that we might even process information about others in a slightly more rational and objective manner than we process our own information, even as we firmly maintain our own subjective investment in the issue. But whatever the other contributory factors may be, these results suggest a clear distinction between how we ourselves process information about homosexuality, and how we predict others will process the same information.

The overall findings were anticipated, and generally consistent with earlier research. Subjects whose attitudes were more open found the genetic evidence to be more
believable, and were generally more prepared to accept it. On the other hand, subjects with strong feelings against homosexuals were not prepared to accept that homosexuality is biological and not a choice. But because these negative feelings have a powerful affective component, they are largely irrational and resistant to rational argument. If they were rational, a strong body of attributional research (e.g. Aguero, Black, & Byrne, 1984; Ernulf, Innala, & Whitam, 1989; Whitley, 1990) would suggest that scientific evidence in favor of biological causation would effect a significant reduction in negative feelings toward homosexuals. However, such strong resistance to the scientific information suggests that, consistent with Herek's (1986, 1987) neo-functional position, homonegative feelings meet a deeper need. Furthermore, if anti-homosexual feelings fulfill a powerful expressive function for the individual, then a challenge to those feelings would be aversive and unacceptable. Consequently, dismissal or diminishment of any contradictory new evidence would be predictable according to Festinger's (1957) cognitive dissonance theory. If, as this theory posits, new information provokes discomfort by challenging firmly held beliefs, then it will be discounted in order to reduce the aversive effects of the challenge. Simply put, if the previous beliefs are firm and comfortable, and the suggested alternative is not, then the alternative is rejected. These
results offer a strong indication, on this subject at least, that rational argument is ineffective in changing a position that has been reached irrationally, and that irrational positions might better be challenged once the nature of the functions they perform is understood.

The six additional items were included in the study with the intent of highlighting potentially interesting issues for related research. These items focused on the longer term effects if future research were to prove homosexuality to be genetic, and if scientists were to successfully identify the 'gay' gene. One particular result was compelling and unexpected. Subjects who identified themselves as having fundamentalist religious affiliation scored significantly higher than non-fundamentalists in both questions concerning pregnancy termination. Fundamentalists felt more strongly than non-fundamentalists that, if a fetus could be identified as homosexual, termination of the pregnancy would be acceptable, and termination should be made legal and available under that particular circumstance. Mean scores for both groups are still low. Nonetheless, in view of the fact that this society is largely in favor of reproductive choice, while fundamentalists universally attack and abhor abortion, this particular finding seems inconsistent and surprising. Closer evaluation offers a logical explanation, but the implication is clear. For just as religious fundamentalists have attacked abortion, so they
have also attacked homosexuals. This particular issue, in its way, juxtaposes the two, in effect offering a choice between them, if such a choice were possible. If it were scientifically possible, would it be acceptable to eliminate one 'wrong' by the practice of another 'wrong'? It's a deeply rooted philosophical question with infinite implications. But in this particular instance the question is specific. If there were a choice between ending homosexuality and ending abortion, which would be preferable? The results suggest that fundamentalists would rather eliminate homosexuals than abortions, a conclusion that offers a powerful testimony to the deep visceral strength of the issue. Interestingly, however, there was no significant relationship between religiosity and acceptability of pregnancy termination, although the more religious were in favor of continued genetic research if it resulted in the elimination of homosexuality. The abortion issue did, however, see a division across gender lines, with men significantly more in favor of aborting a potentially homosexual fetus than women.

Before any firm conclusions are drawn from these results, certain limitations should be addressed. The study design was non-experimental, and since participants were asked simply to report their responses, those responses were, in effect, anecdotal. As such, the results are based simply on what the participants said they would do. In the
future, a truly experimental study assigning treatment and control groups is likely to offer a much more robust and substantial set of data from which to draw conclusions. Also, the scientific evidence presented was, for convenience, brief, concise, and offered in a popular magazine format. Consequently, the possible effects of longer term exposure to similar information could not be assessed. Furthermore, in assessing the credibility of the information itself, the degree to which subjects found the information sources credible was not examined. Future studies might benefit from a measure designed specifically to assess source credibility, a more longitudinal approach to information response, and the use of a wider range of media sources. Caution should also be advised in assessing the demographic results, due to the an imbalance in some of the subsamples. The sample population was generally more religious than might be expected from the nation at large, with the not very religious and the not-at-all religious together accounting for only 9% of participants. Small sample size (n = 27) was also a concern with the results addressing fundamentalist affiliation, and female subjects outnumbered males by more than three to one. Similar demographic studies should attempt to rectify these imbalances in order to draw more solid conclusions in the future.

Despite these caveats, the results of the analysis were encouraging. The determination of a bi-dimensional
measure of attitudes toward homosexuals might have positive implications for the future. It should not, however, be viewed as contradictory to the work of earlier researchers in this field (Hansen, 1982; Kite & Deaux, 1986), but rather as an augmentation. The Kite Attitude Toward Homosexuality Scale (Kite & Deaux, 1986), in particular, offered a powerful tool in assessing the degree of negativity towards homosexuals, and the results of this study underscore the strong relationship between homonegativity and both closed-affective and open-informational attitudes. And as expected, results also showed homonegativity to be a significant predictor of a negative response to the scientific information. The Homonegativity scale was, however, formulated specifically as a uni-dimensional measure to assess only negative attitudes. By suggesting openness to information about homosexuality as a supplementary element in assessing attitudes, it is hoped that this current study might serve to complement the earlier research.

There is little doubt that attitudes toward homosexuality have changed dramatically over the past two decades. Gay artists, musicians, actors, sportsmen, and even politicians now talk openly about their sexuality, while positive portrayals of gay characters, and informed representations of homosexual issues, abound in the media. Such a level of openness and acceptance would have been unthinkable a generation ago. Nonetheless, as large numbers
of Americans become more tolerant and accepting, there remains a large proportion of the nation for whom homosexuality is still anathema, a conviction grounded largely in the belief that homosexuality is aberrant - and chosen. Current scientific research suggesting that homosexuality may be genetically predetermined has begun to offer a direct challenge to this position. The aim of this study was to revisit contemporary attitudes toward homosexuality, and examine the effects these new scientific findings may have on these attitudes. Many activists maintain that acceptance will come once society understands that homosexuality is not a choice, and that rigorous efforts to that end will bring about the change. It might not be so easy. Negative feelings toward homosexuals are held too deeply, and too firmly, to be relinquished without a struggle, and simple education is unlikely to be enough. For not only are the negative feelings deep and firm, but the very information that might be effective in changing them is selectively evaluated and discounted. The signs, however, are good. But there is still much work to be done, and a long, long way to go.
Appendix A (i)

Open Informational Scale

1) Colleges should offer more opportunities for open discussion of homosexuality.

2) I would be interested in talking to a homosexual about his opinions and feelings.

3) If I were reading a favorite magazine and came across an article about homosexuality, I would probably take the time to read it.

4) It is important for society to learn more about homosexuality.

5) Learning more about homosexuality will help me better understand the problems facing gays.

6) Homosexuality is an appropriate subject for research.

7) I could discuss homosexuality rationally with my friends.

8) More research into homosexuality would be a waste of time and money. *

* Item reverse scored.
Appendix A (ii)

Closed Affective Scale

1) If I see a scene between two homosexuals in a movie I have to look away.

2) This country would be a lot better without homosexuals.

3) A TV movie about homosexuals would be of no interest to me.

4) The thought of two men together makes me ill.

5) I know in my heart that homosexuality is wrong.

6) Homosexuality is a matter of morality.

7) Love between two men is a sin.

8) I would stay well clear of an openly gay classmate.
Appendix A (iii)

Kite Attitude Toward Homosexuality (Homonegativity) Scale

1) I would not mind having homosexual friends.*

2) Finding out that an artist was gay would have no effect on my appreciation of his work.*

3) I won’t associate with known homosexuals if I can help it.

4) I would look for a new place to live if I found out my roommate was gay.

5) Homosexuality is a mental illness.

6) I would not be afraid for my child to have a homosexual teacher.*

7) I do not really find the thought of homosexual acts disgusting.*

8) Homosexuals are more likely to commit deviant sexual acts (such as child molestation, rape, and voyeurism).

9) Homosexuals should be kept separate from the rest of society (i.e. housing, restricted employment).

10) Two individuals of the same sex holding hands or displaying affection in public is revolting

11) The love between two males or two females is quite different from the love between two persons of the opposite sex.

12) I see the gay movement as a positive thing.*

13) Homosexuality, as far as I’m concerned, is not sinful.*

14) I would not mind being employed by a homosexual.*
15) Homosexuals should be forced to have psychological treatment.

16) The increasing acceptance of homosexuality in our society is aiding in the deterioration of morals.

17) I would not decline membership in an organization because it had homosexual members.*

18) I would vote for a homosexual in an election for public office.*

19) If I were a parent, I could accept my son or daughter being gay.*

* Items reverse scored.
Researchers say they have taken a major stride toward identifying a gene that may importantly influence the development of some cases of male homosexuality.

The new evidence, published in the July 16 "Science", suggests that a gene lying within a small stretch of the X chromosome inherited by men from their mothers, contributes to the sexual orientation of a subset of homosexual men.

"We haven't identified the gene yet, and any theory of how it works is speculative" asserts Dean H. Hamer, a geneticist at the National Cancer Institute in Bethesda, Md., who directed the study. However, a gene wedged into a tiny segment of DNA—containing perhaps as few as several hundred genes—probably performs functions linked directly to sexual orientation, Hamer proposes.

They employed 22 "marker" enzymes to make cuts at precise points along the X chromosomes of 40 pairs of homosexual brothers and available members of their immediate families. Thirty-three pairs of brothers displayed the same cluster of five markers bunched into a small region on the X chromosome, suggesting that these families possessed a maternally transmitted gene that predisposed them to homosexuality, the scientists assert.

Confirmation of the finding and isolation of the gene may clarify the evolutionary significance of genes that
influence homosexuality, adds Richard C. Pillard, a psychiatrist at Boston University School of Medicine, who has studied homosexual twins

- B. Bower

SCIENCE NEWS, July 17, 1993
Appendix B (ii)

Stimulus Article 2

Efforts to solve the riddle of human sexuality advanced in still another direction last week...In 1993 the debate grew fiercer after researchers announced a study linking some male homosexuality to genes inherited from the mother. Now the same team has come up with evidence that bolsters its earlier findings and supports the theory that 'gay genes' may predispose some men to seek partners of the same sex.

In the new study, scientists analyzed DNA from pairs of brothers, both of whom were gay, in nearly three dozen families with a history of homosexuality on the mother’s side. Focusing on the female X chromosome that men inherit from their mother (they also get a Y from their father), the researchers found that two-thirds of the gay siblings shared a distinctive pattern along a segment of their X chromosome.

The findings, which were published in the journal "Nature Genetics", suggest that at least one gene on the X chromosome - and possibly more - influences whether a man becomes homosexual.

The next step for researchers is to locate the precise gene or genes involved and attempt to determine their biochemical effects.

-Anastasia Toufexis

Appendix C (i)

Credibility of Information Scale

1) Homosexuality is a trait, like left-handedness.
2) I do not believe homosexuality is passed down from a parent.*
3) I believe homosexuals choose to be that way.*
4) Further gene studies will tell us more about the cause of homosexuality.
5) Homosexuals cannot help who they are.
6) This scientific explanation does not convince me that homosexuality is biologically caused.*
7) Homosexuality is not inherited from mothers.*
8) Chromosomes may well determine homosexuality.
9) Homosexuals probably want to be different.*
10) Genetic studies hold the key to sexual orientation.
11) If two brothers are homosexual it’s because they’ve made similar lifestyle decisions.*
12) Studying the cause of homosexuality through DNA is useless.*

* Items reverse scored
Appendix C (ii)

Personal Effectiveness Scale

1) I will become more in favor of equal rights for homosexuals.
2) I will be less tolerant of jokes that make fun of homosexuals.
3) I can now make more informed decisions about homosexual issues.
4) If a fellow student told me he was homosexual I would not want to be around him.*
5) I am now more strongly opposed to job discrimination against homosexuals.
6) I feel more positively about legal recognition of gay partnerships.
7) I can sympathize more with the problems of people growing up homosexual.
8) I’ll be more comfortable talking about homosexuality.
9) I will probably be more friendly towards a homosexual co-worker.
10) I will be more sympathetic towards homosexuals who want to adopt a child.
11) I will be more likely to accept a family member who is gay.
12) I will be more sympathetic to the problem of gay bashing.

* Items reverse scored
Appendix C (iii)

Social Effectiveness Scale

1) Americans will accept this new information about homosexuality.

2) People in this country will not accept that homosexuality is genetically caused.*

3) These scientific findings will make everyone think less negatively about homosexuals.

4) People will treat homosexuals with more respect.

5) Society will not become more tolerant of homosexuals.*

6) People are likely to be more understanding if a friend tells them he is gay.

7) This will make Americans less tolerant of job discrimination against gays.

8) Parents will feel more comfortable about a teacher who may be gay.

9) Most people will not change their attitudes about homosexuals.*

10) Families will now find it easier to talk about homosexuality.

11) Parents will be more prepared to accept a son who is homosexual.

12) Young parents will be more aware that their son might grow up to be gay.

* Items reverse scored
Appendix D

Informed Consent

Attitudes Toward Homosexuals

Department of Psychology, California State University, San Bernardino

This study is being conducted by Stephen Jeffers in association with Dr. Gloria Cowan.

The purpose of this study is to examine current attitudes and opinions about homosexuals. You may be a little uncomfortable with the subject matter, but we would like you to answer every question thoughtfully. Participation will involve approximately 30 minutes of your time. This study has been approved by the Psychology Department Human Subjects Review Board.

Stephen Jeffers can be reached at (760) 327-3768, or through Dr. Cowan’s office in JB 557 if you have any questions regarding this study.

1. The study has been explained to me and I understand the explanation that has been given, and what my participation will involve.

2. I understand that I am free to choose not to participate in this study without penalty, free to discontinue my participation in this study at any time, and free to choose not to answer any of the questions.

3. I understand that my responses will remain anonymous, but that group results of this study will be made available to me at my request.

4. I understand that, at my request, I can receive additional explanation of this study after my participation is completed.

(NOTE: Participation in this study is worth extra credit for those attending California State University classes).

A check or 'x' mark below signifies that I have read and understand the above information, and that I consent to participate voluntarily.

Place check mark here □

Your participation in this study is greatly appreciated.
References


chromosome and male sexual orientation. Science, 253, 1034-1037.


