The Effects of Attitudes Towards Homosexuality on the Ability to Reason Logically About Homosexuality

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THE EFFECTS OF ATTITUDES TOWARDS HOMOSEXUALITY ON THE ABILITY TO REASON LOGICALLY ABOUT HOMOSEXUALITY

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Jeanette E. Myers

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THE EFFECTS OF ATTITUDES TOWARD HOMOSEXUALITY ON THE
ABILITY TO REASON LOGICALLY ABOUT HOMOSEXUALITY

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The effects of attitudes towards homosexuality on the ability to reason logically about homosexuality

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This researcher examined how participants' attitudes towards homosexuality influenced their ability to reason on logic test items concerning homosexuality. A 64-item logic test was developed to measure distortion in reasoning due to prohomosexual or antihomosexual beliefs (measured by 32 items), while controlling for distortions caused by the truth or falseness of conclusions on nonhomosexual matters (also measured by 32 items). McFarland's (2000) abbreviated version of the Attitudes Towards Homosexuality Scale (ATH Scale) was administered to directly measure participants' attitudes. The logic test and ATH Scale was administered to 201 undergraduate psychology students. Data analyses showed a significant amount of distortion due to the truth-value of the conclusion. Correlations between scores on the logic test and the ATH Scale, after partialing out the effects of the truth-value of the conclusions, showed that on the logically valid items where accuracy was generally high, both antihomosexual and prohomosexual attitudes produced logical distortion in the direction of those attitudes. But on the invalid items, where logical error rates were much higher, only antihomosexual attitudes led to distortion. Overall, the findings provide more support for hypothesis that people with antihomosexual attitudes distort reasoning in keeping with their attitudes about these issues than do those with prohomosexual attitudes.
Introduction

A number of researchers have examined how participants' attitudes toward groups and issues influence their ability to reason logically about these targets (e.g., Morgan, 1945; Morgan & Morton, 1944; Thistlethwaite, 1950). The method typically used is that of measuring distortion of logic by a logic test that contains both items about the target of interest and parallel items on neutral, unrelated issues. A respondent's distortion of logic is usually measured as the number of errors on the target-related items minus the number of errors on the neutral items. It is commonly found that respondents distort the logic of the test to fit their beliefs regarding the conclusion.

The present study focuses on the influence of attitudes toward homosexuality on logical reasoning about issues concerning homosexual persons. This study will expand on the past research by controlling for the degree that the truth-value of conclusions affects the reasoning process, directly measuring attitudes, and examining how positive as well as negative attitudes toward homosexuality might distort reasoning on issues involving homosexuality.

Distortion of Reasoning

In the 1940s, several researchers began to investigate the possibility that openly expressed attitudes, such as responses to public opinion polls, might not reflect true attitudes. Researchers felt that if this was the case, a method to detect true attitudes needed to be developed. One of the first attempts at developing such a method was by Morgan and Morton (1943). Their study was based on the idea that as subject matter becomes more controversial, individuals are less likely to express their views openly.
Morgan and Morton presented participants with logical syllogisms, identical in form, involving either controversial or noncontroversial subject matter. The controversial subject matter consisted of syllogisms about government control of farm prices, rationing of gasoline, and Darlan (a French general of the Vichy government who supported the Nazis). Noncontroversial subject matter included syllogisms about liars and beauty. Participants were given two premises and then asked to select from five possible conclusions, only one of which was valid. Results from this study indicated that there were significant differences in the manner in which participants responded to the controversial and noncontroversial material. When selecting a conclusion for a syllogism containing controversial material, participants were inclined to select the conclusion that agreed with popular opinion, even if doing so violated the logic of the syllogism, whereas on noncontroversial materials, no such tendency existed. This difference in responses was termed "distortion." The ability to reason logically was thus distorted by the beliefs of the respondents.

Morgan and Morton (1944) continued to test this method of indirectly measuring attitudes. In addition, they explored the role that "atmosphere effects" play in the reasoning process. Atmosphere effects occur when the subject tends to accept a conclusion that has the same type of proposition as the premises. For example, when the premises contain universal-affirmative propositions (all-yes), participants might tend to favor a conclusion that has the same proposition. The following is an example of how this effect works:

Given: All dogs have fur.

All dogs are mammals.
Which of the following is a valid conclusion?

a) All mammals have fur.

b) Some mammals have fur.

c) No mammals have fur.

d) No logical conclusion can be made.

In this example, the respondent would tend to accept (a) as the conclusion because it has the same proposition (i.e., all) as the premises, even though (b) is the response that is logically accurate.

This issue was examined in order to ensure that personal beliefs could account for the observed effects beyond the distortion attributable to atmosphere effects.

Participants were provided with two premises that contained either letter symbols or content relating to important issues of the time. The controversial syllogisms related to various issues regarding WWII such as Japanese soldiers, Italian soldiers, Nazis, gasoline rationing, censorship, and propaganda. Participants were then asked to select from among five possible conclusions. The results of this research showed that the selection of the conclusion was influenced by the following factors: logic, atmosphere effects, personal conviction, and chance. In addition, the degree that these factors influenced the selection of a conclusion varied depending upon whether letter symbols or emotional issues were used in the syllogisms. When letter symbols were used, the role of the above mentioned factors could be broken down in the following manner: 50% atmosphere effects, 25% logic, and 25% chance factors. With syllogisms containing issues that were likely to evoke an emotional response, the factors could be broken down as follows: 25% atmosphere effects, 20% logic, 20% chance factors, and
35% personal conviction. This study demonstrated that when emotional issues were involved, personal conviction distorted the participants' logical reasoning in the direction of their beliefs about the conclusions, even after controlling for atmosphere effects.

Morgan (1945) used the previously developed method to assess the attitudes of students toward the Japanese. This study was similar to the prior studies with the following exceptions: Syllogisms with neutral content were used instead of letter symbols, and overtly expressed attitudes were measured. The authors administered a logic test and a true/false questionnaire asking the participants to indicate whether they believed it was true that the eyes of the Japanese were inferior, that the Japanese are not assimilable in American society, that the Japanese are untrustworthy, and that the Japanese are inherently more cruel than White men. The percent of participants that regarded these statements as false ranged from 66% to 85%, indicating that their attitudes were not as negative toward the Japanese as might have been expected, given that the United States was involved in WWII at the time. When comparing responses to the emotional syllogisms to the neutral syllogisms, they found significant differences in the responses on the issues of trustworthiness and cruelty. Responses to the syllogisms tended to be more favorable toward the Japanese than were responses to the true/false statements. The authors indicated that the differences in responses to the syllogisms and the questionnaire provided evidence that pressure from society was preventing the participants from fully expressing the degree to which they were not engaging in wholesale condemnation of the Japanese when responding to the true/false questionnaire. The tendency to avoid wholesale condemnation of the Japanese
manifested itself more fully in responses to the syllogisms. The results of this study support the proposition that openly expressed attitudes do not always agree with attitudes expressed when responding to syllogisms that contain emotional content.

Lefford (1946) used a similar method to measure reasoning distortion. Participants were asked to judge the validity of neutral and emotional items. Examples of the content of the neutral items included geometric shapes, Phi Beta Kappa, insects, and health. Examples of the content of emotional items included the existence of God, war, communism, and welfare programs. Participants were also asked to indicate if they agreed or disagreed with each conclusion. The results of the study indicated, again, that beliefs influence reasoning. Participants were able to judge the validity of neutral syllogisms more accurately than that of emotional syllogisms. The authors also noted that knowledge about the truth of the conclusions on neutral syllogisms influenced reasoning in the direction of that knowledge; that is, respondents were somewhat likely to judge a invalid syllogism with a factually true conclusion to be valid and a valid syllogism with a factually false conclusion to be invalid; knowing the truth or falseness of the conclusion made it difficult to attend purely to the logic of the syllogism.

Janis and Frick (1943) examined whether attitudes toward the conclusion of a syllogism play a role in judging its logical validity. The authors hypothesized that when the validity judgement corresponded with the degree to which the respondents believed the conclusion (i.e., valid/believable, invalid/unbelievable) respondents would make fewer errors when judging the validity of a conclusion; when the validity judgement and belief did not correspond (i.e., valid/unbelievable, invalid/believable) more errors would occur. The authors administered a syllogism test with valid and
invalid arguments that had conclusions that were considered to be generally believable or generally unbelievable. In addition, an attitude test comprised of a list of the conclusions used in the syllogism test was administered. Participants were asked to indicate if they agreed or disagreed with the statements. The results of a chi-square test showed that the obtained frequency of errors on the valid/believable and invalid/unbelievable syllogisms was significantly lower than the expected frequency of errors. Participants made significantly more errors on syllogisms when there was a conflict between logical validity and believability.

Thistlethwaite (1950) studied the effects of "emotional" attitudes toward Blacks, Jews, women, and nationalistic themes on logical reasoning about these groups and themes. He sought to improve upon earlier research by minimizing atmosphere effects through the use of several forms of inference and by including syllogisms related to these several groups and themes. He chose to use nonsyllogistic forms of inference for two reasons: Such forms of inference would be more representative of common forms of inference, and such forms do not use quantification symbols (i.e., all, some, none), thereby reducing the likelihood that atmosphere effects would play a role in judging the validity of logic problems. Distortion was measured as differential errors on the "emotional" items (those concerning these groups and themes) as compared to errors on items with similar logic on other, "neutral" groups and themes. This study was similar to the prior studies in that neutral and emotive syllogisms were used. However, Thistlethwaite used six forms of inference and included emotive syllogisms on the four topics mentioned above. The logic test consisted of 72 items (36 neutral and 36 emotive). The emotive statements were constructed in such a manner that
prejudiced participants might be likely to respond to the statements incorrectly.

Participants in this study consisted of students from universities in northern, western, and southern states. Participants from southern states were believed to be more ethnocentric than those in northern or western states based on the social atmosphere in the region. Results showed that the mean distortion for the southern group and northern group were 2.92 and 1.59 errors, respectively, with the difference significant beyond the .01 level. In short, in comparison with their own performance on the neutral syllogisms, southern students were more likely than northern students to distort their reasoning on the prejudice-related syllogisms in a prejudiced direction.

In summary, the research cited above provides evidence that distortion of reasoning due to attitudes about the content of the syllogisms does occur, and that atmosphere effects are not the sole source of reasoning distortion. The present research used a logic test similar to that of Thistlethwaite (1950). Also, the Attitudes Toward Homosexuality Scale (Kite & Deaux, 1986) was used to allow comparisons between responses on the logic test and openly expressed attitudes. Scores on the Attitudes Toward Homosexuality Scale were correlated with distortion scores on the logic test in order to determine if logic is only distorted by individuals who have negative attitudes toward homosexuality or if those with positive attitudes toward homosexuality also distort logic in the direction of their beliefs.

Are Distortions Caused by Prejudice or Extreme Attitudes?

Thistlethwaite's results suggest that individuals with prejudiced attitudes are more likely to distort the logic of the premises to fit their beliefs than are individuals without prejudice. However, an alternate possibility is merely that individuals with
strong or extreme beliefs about a topic are more likely to distort logic in the direction of their beliefs than are those whose beliefs are less strong or extreme. If that is so, it may be that persons with both strong antihomosexuality attitudes and strong prohomosexuality attitudes equally distort logical inferences in directions that fit, respectively, their antihomosexuality and prohomosexuality beliefs. The inability to reason logically may result from both prejudice against a group and strong beliefs in their favor. In the present study prejudice was defined as “A negative attitude toward a socially defined group and toward any person perceived to be a member of that group.” (Ashmore, 1970).

This latter possibility might be labeled as the extremity hypothesis. In its broadest form, the extremity hypothesis asserts that individuals at opposite extremes on political or social attitudes share common characteristics that differentiate them from more moderate individuals. While no studies were located in support of this view in the domain of attitudes toward targets of prejudice, past research in other domains suggests that individuals with opposing, extreme views on a topic or issue can share common qualities. Examples of this can be found in the research of Tetlock (1984, 1986), Eysenck and Coulter (1972), and Rokeach (1960). Tetlock (1986) examined how his value pluralism model could be used to predict the manner in which people reason when they must choose between opposing values that they support. The value pluralism model is an attempt to explain how individuals make choices regarding core values when these values come into conflict with each other. For example, suppose a voter is prolife and against the death penalty and a candidate is prochoice but is in favor of the death penalty. The value pluralism model examines the reasoning behind the
trade-offs that take place in such situations. According to Tetlock's results, when economic issues are involved, as one travels along the continuum from a moderate socialist to extreme socialist there is a reduction in complex reasoning (i.e., extreme socialists engaged in less complex reasoning than did moderate socialists). Likewise, there is also a reduction in complex reasoning as one moves along the continuum from moderate to extreme conservatism. Thus, in keeping with the extremity hypothesis, individuals at opposite extremes are alike in that they reason less complexly than do those whose political views are less extreme. Tetlock (1984) found that moderate socialist members of the British Labor party used complex reasoning skills when deciding what trade-offs to accept when making policy decisions, whereas members on the left and right of the Labor party displayed less complex reasoning.

Eysenck and Coulter (1972) studied the personality traits of British Communists and Fascists, representatives of the extreme political left and extreme political right. Eysenck and Coulter compared members of the British Communist and Fascist parties to a control group on the following variables: tough-mindedness, intolerance of ambiguity, authoritarianism, rigid thinking, and emphatic. The researchers found that members of both extreme parties scored higher than the control group of moderates on all of the variables listed above, indicating that groups at opposite extremes, politically speaking, may share common personality traits that differentiate them from those with more moderate political beliefs, again supporting an extremity hypothesis.

According to Rokeach (1960), ideological dogmatism is associated with the following: a closed way of thinking, authoritarianism, and intolerance for those with opposing beliefs. Rokeach hypothesized that dogmatism is not associated with one
specific ideology but with extreme attitudes in either a left or right, liberal or conservative, direction. Therefore, individuals whose attitudes about a particular issue fall at opposite ends of a continuum could both score high on Rokeachs' Dogmatism Scale. In order to test this hypothesis, Rokeach (1960) administered the following scales: the Dogmatism Scale, the Opinionation Scale, the F Scale, and the Ethnocentrism Scale to Catholics from Michigan and New York (considered right of center) and nonbelievers from New York and English communists (considered left of center). The results indicated that groups who were considered to be left-of-center and groups who were considered to be right-of-center both scored high on the Dogmatism Scale and high on the Opinionation Scale in comparison to those closer to the political center.

In summary, there is evidence to suggest that individuals holding extreme viewpoints in opposite directions share in common simplistic thinking, toughmindedness, and dogmatism. Based, then, on the extremity hypothesis and this evidence supporting it in other domains, this study intends to examine whether only individuals who are strongly antihomosexual distort logic in support of their beliefs or whether both individuals with extreme antihomosexuality and prohomosexuality attitudes do so.

Truth-Value

Researchers have also studied other possible explanations for distortion of reasoning. Particularly, many studies have examined the possibility that the believability of the conclusion, regardless of the content of the syllogism, influences the ability of the participant to reason logically. According to Newstead, Evans, and Allen
people are more likely to accept the conclusion of a syllogism if they find it to be believable regardless of its logical validity. In addition, studies have shown that there is an interaction between belief and logic. Specifically, logic has a larger effect upon distortions of syllogisms that have unbelievable conclusions than on believable conclusions. In a series of five studies, Newstead et al. (1992) tested three proposed sources of belief bias: selective scrutiny, misinterpreted necessity, and the mental models theory. The selective scrutiny theory proposes that people engage in logical reasoning only if they find the conclusion of a syllogism to be unbelievable; if they find the conclusion believable, they simply don’t take time to examine the syllogism carefully. The misinterpreted necessity theory proposes that participants do not understand what the process of formal reasoning means. They fail to realize that when using formal logic they should accept a conclusion as valid only when the conclusion necessarily follows from the premises. Thus, they base their decisions regarding validity on the believability of the conclusion. Lastly, the mental models theory proposes that participants base judgements of validity on whether or not the conclusion agrees with the first mental model they construct when they read the premises. If this model is consistent with the conclusion then that conclusion will be accepted. However, if this model is inconsistent with the conclusion then alternative models will be considered.

To test these theories, Newstead et al. (1992) constructed logical syllogisms that had either believable or unbelievable conclusions. In Experiments 1 and 2, Newstead et al. presented participants with a set of syllogisms that included valid and invalid syllogisms. The invalid syllogisms were constructed so that all of the conclusions were
definitionally false. In this way it would be impossible for errors to occur based on the misinterpreted necessity model because the correct validity judgement and the judgement based on belief would always be the same on the invalid arguments. As predicted, the interaction between the validity of the syllogism and belief was not present in this experiment. In Experiments 3 and 4, the authors examined the ability of the mental-models theory to explain the interaction. In these experiments the authors used valid syllogisms and invalid syllogisms that could result in only one mental model being constructed. However, in this instance the conclusions of the invalid syllogisms could be definitionally true. According to Newstead et al., if the interaction returned the misinterpreted necessity model would be supported. If the interaction was not present, the mental-models theory would be supported because an interaction will be possible only when multiple-models can be constructed. The results of Experiment 3 showed that the interaction was not present but the effects of belief on logic were significant. The authors thus found that the mental-models theory provided the best explanation of the interaction between belief and logic. In the final experiment, the authors were able to eliminate the interaction between belief and logic by stressing in the instructions that judgements about validity should be based on logical necessity.

Revlin, Leirer, Yopp, and Yopp (1980) studied the "conversion model" explanation for errors in logical reasoning. The "conversion model" postulates that errors in reasoning are not caused by an inability to reason logically, but by errors in encoding the premises of the syllogism. According to the "conversion model," errors occur when a reasoner encodes both the premise that he/she is given and its converse as true statements. For example, if a reasoner were given the statement "all dogs are
mammals" he/she should accept this as true based on the rules of logic. However, he/she may also convert this statement into “all mammals are dogs” and assume that this statement should also be accepted as true. Therefore, the reasoner may incorrectly base the selection of a valid conclusion on this converted premise. To test the “conversion model,” the authors conducted two experiments. In Experiment 1, the authors classified participants as “converters” or “nonconverters” based on responses to a questionnaire containing the premises and their converses. Participants were asked to rate the degree of the relationship between categories contained in the premise. For example, participants were provided with the premise “all women are bad drivers” and asked to indicate the degree to which they believed that there was a relationship between being a woman and being a bad driver. Later in the questionnaire the participants were provided with the converse of this statement (all bad drivers are women) and asked to indicate the relationship between being a bad driver and being a woman. Participants who rated the relationship as being 60% or more on converse statements were considered to be “converters,” and all other participants were considered “nonconverters.” Participants were also given 16 reasoning problems containing the premises that were included in the questionnaire. Participants were asked to select from five possible conclusions. Results showed that the “conversion model” could accurately predict up to 80% of all decisions made on the reasoning problems.

In Experiment 2, the authors predicted that, after controlling for premise encoding, the truth-value of the conclusion would have no effect on the acceptance of a conclusion. Participants were asked to solve 28 categorical syllogisms that could be
broken down into two categories: logic agrees with belief and logic conflicts with belief. The results showed that on problems where logic and knowledge were in conflict, reasoning accuracy deteriorated significantly. While the authors did find errors in reasoning after controlling for errors due to conversion of the premises, closer examination of the responses discounted the belief bias theory as an explanation. The authors pointed out that participants did not reject the valid/unbelievable conclusion for an invalid/believable conclusion but instead opted to select the “No conclusion” response rather than the response that they believe to be true. The authors concluded that errors are not due to belief bias but due to conversion of the premises, which is not an error in logical reasoning but an error in the encoding of the premises.
The Present Study

Based on the literature reviewed, this study examined the effects of attitudes toward homosexuality on logical reasoning. Prior research has indicated that attitudes can interfere with the ability to reason logically. Therefore, the present study included a logic test that asked participants to judge the validity of neutral arguments and arguments relating to homosexuality. Research also indicates that the truth-value of the conclusion affects individuals' ability to reason. This study took this possibility into account by including valid and invalid logical forms with factually true conclusions and valid and invalid logical forms with conclusions that are factually false. In addition, this study examined distortion in logic as both a function of negative attitudes concerning homosexuality and positive attitudes concerning homosexuality.

In order to distinguish between errors due to the truth-value of a conclusion and errors due to attitudes toward homosexuality, the present study included logical arguments that have conclusions of four types: factually true, factually false, prohomosexuality, and antihomosexuality. Each of these conclusions was presented with logical forms that are logically valid and logically invalid. In addition, based on the research by Newstead et al. (1992) indicating that instructions impact reasoning scores, this study provided instruction emphasizing how the logical reasoning processes work. This instruction provided examples of the logical reasoning forms that were used in the study.

Although there is no direct evidence regarding negative and positive attitudes toward homosexuality and levels of distortion, research in other areas provided a basis for believing that people with extreme negative attitudes toward homosexuality and
those with extreme positive attitudes toward homosexuality may both display a tendency to distort logic in favor of their attitudes. To test this hypothesis, the logic test included valid and invalid arguments that have prohomosexuality conclusions and valid and invalid arguments that have antihomosexuality conclusions. In addition, many of the past studies on attitudes and distortion of reasoning have failed to directly measure attitudes concerning the emotional material (e.g., Morgan & Morton, 1943; Morgan & Morton, 1944; Thistlethwaite, 1950). The present study included a questionnaire to measure attitudes toward homosexuality. Based on the research reviewed above, the following alternative hypotheses were tested:

_Hypothesis 1._ Based upon Thistlethwaite’s results suggesting that prejudiced persons distort logical reasoning to fit their prejudices, there will be a positive linear relationship between responses to the Attitudes Toward Homosexuality Scale and distortion due to negative attitudes toward homosexuality, or

_Hypothesis 2._ Based upon the findings by Rokeach (1960), Eysenck and Coulter (1962) and Tetlock (1984) suggesting an “extremity hypothesis,” there will be a curvilinear relationship between responses to the Attitudes Toward Homosexuality Scale and distortion due to attitudes toward homosexuality; respondents with high and low scores on the Attitudes Toward Homosexuality Scale will have higher distortion scores than will those respondents with less extreme attitudes concerning homosexuality.
Method

Participants

Two hundred and one participants (129 females and 72 males) were recruited from undergraduate psychology classes at Western Kentucky University in Bowling Green, Kentucky. The participants had a mean age of 20.29 years. Ethnic groups represented in the sample included 170 Caucasians, 23 African Americans, 1 Hispanic, and 2 Asians. There were 30-60 participants in each group. Students were informed that participation in the study was voluntary, given informed consent forms, and assured that individual responses would be kept confidential.

Materials

Logic test. The logic test was constructed in a manner similar to the method used by Thistlethwaite (1950). In order to select which forms of logical inference to use for the test, a pretest was administered to 49 undergraduate psychology students at Western Kentucky University. The purpose of this pretest was to determine how well participants would score on the six logical forms of inference used by Thistlethwaite (1950). This pretest indicated that participants had difficulty determining the correct response for three of the more difficult forms of inference, even on nonemotional items. Therefore, it was decided that the three forms of inference that the participants scored best on and an easier form that was not used by Thistlethwaite (1950) would be used. The pretest data also indicated a tendency for the participants to respond to neutral statements based on the truth-value of the conclusion regardless of the validity of the logical form. Based on these pretest findings, the final version of the logic test was developed to include both logically valid forms with both factually true and
factually false conclusions and logically invalid forms with factually true and factually false conclusions.

The final version of the logic test included the following forms of inference (see Appendix A for complete logic test):

Form 1: If p then q. p. Therefore, q. (valid)
Form 2: If p then q. If q then r. p. Therefore, r. (valid)
Form 3: If p then q. Not p. Therefore, not q. (invalid)
Form 4: If p then q. q. Therefore, p. (invalid)

For each of the forms of inference, sixteen items were included. The set of sixteen on each logical form contained four items with factually true conclusions, four with factually false conclusions, four with prohomosexuality conclusions and four with antihomosexuality conclusions. An example (and definition) of each of the four types of conclusions follows (All examples use logic form 1):

1) **Factually True Conclusion**: Conclusion that would be considered true based on common knowledge. For example:

   Given: If gasoline is an economical type of fuel, then gasoline is the most common fuel used in automobiles.

   Gasoline is an economical type of fuel.

   Therefore: Gasoline is the most common fuel used in automobiles.

2) **Factually False Conclusion**: Conclusion that would be considered false based on common knowledge. For example:

   Given: If February is shorter than April, then February is warmer than April.
February is shorter than April.

Therefore: February is warmer than April.

3) Prohomosexuality Conclusion: Conclusion that portrays homosexuality in a positive manner. For example:

Given: If most homosexuals are nice people, then homosexual marriages should be legal.

Most homosexuals are nice people.

Therefore: Homosexual marriage should be legal.

4) Antihomosexuality Conclusion: Conclusion that portrays homosexuality in a negative manner. For example:

Given: If homosexuals abuse property, landlords should be allowed to not rent to homosexuals.

Homosexuals abuse property.

Therefore: Landlords should be allowed to not rent to homosexuals.

Based on responses to these logical arguments, the following variables were computed: Distortion due to the truth-value of the conclusion, distortion in an antihomosexuality direction, and distortion in an prohomosexuality direction.

Distortions due to the truth-value of conclusions was computed as follows:

\[
\text{(errors on valid arguments with factually false conclusions + errors on invalid arguments with factually true conclusions)} - \text{(errors on valid arguments with factually true conclusions + errors on invalid arguments with factually false conclusions)}
\] (1)
To the degree that this difference was positive, a participant distorted logic in the direction of the truth-value of the conclusion.

Distortion in an antihomosexuality direction occurs when a participant judges valid forms of inference with prohomosexuality conclusions to be invalid and judges invalid forms of inference with antihomosexuality conclusions to be valid, controlling for the participants’ truth-value distortion scores. This control made it possible to determine the degree to which distortion in an antihomosexuality direction is specifically associated with antihomosexuality attitudes, rather than merely due to a propensity to accept factually true conclusions and reject factually false conclusions.

The uncorrected calculation of distortion in an antihomosexual direction was made using the following equation:

\[
\text{(errors on logically valid arguments with prohomosexuality conclusions + errors on logically invalid arguments with antihomosexuality conclusions)}.
\]

To control for distortions on the truth-value of the conclusions, the correlation between antihomosexuality distortion and attitudes toward homosexuality was corrected by controlling for the variance associated with Formula 1 by partial correlation.

Evidence for distortion in a prohomosexuality direction occurs when a participant judges valid forms of inference with antihomosexuality conclusions to be invalid and judges invalid forms of inference with prohomosexuality conclusions to be
valid, controlling for the participants’ distortion scores on forms of inference with factually true and factually false conclusions.

The uncorrected calculation of distortion in a prohomosexual direction was made using the following equation:

\[
\text{errors on logically valid arguments with antihomosexuality conclusions} + \\
\text{errors on logically invalid arguments with prohomosexuality conclusions}. \tag{3}
\]

As with antihomosexuality distortions, to control for distortions on the truth-value of the conclusions, the correlation between prohomosexuality distortion and attitudes toward homosexuality was corrected by partialing out the variance associated with Formula 1 (again, by partial correlation).

**Attitudes Toward Homosexuality Scale.** McFarland’s (2000) abbreviated version of the Attitudes Toward Homosexuality Scale was used to assess participants expressed attitudes toward homosexuality. This scale is comprised of ten statements relating to homosexuality. In order to partially disguise the purpose of the measure, these ten statements were embedded in a 50-item attitude survey (see Appendix B for complete attitude survey). McFarland found reliabilities for this shortened scale ranging from .89 to .93 across seven samples. Participants were asked to indicate the degree to which they agreed with each statement using a five-point scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”).
Procedures

Logic test. The logic test was administered to groups of participants at Western Kentucky University. The participants were told that the instrument was a test containing a series of items, involving controversial issues such as homosexuality, designed to test reasoning ability, and that they would be timed. Participants were informed that their participation was voluntary and that all responses would be kept confidential. In addition, participants were provided with information on how to contact the researchers with questions or concerns about the project.

In order to link responses to the logic test with responses to the Attitudes Toward Homosexuality Scale, participants were asked to write a code of four letters or numbers on each instrument. Participants were then provided with written and oral instructions. An example of each of the four forms of inference and an explanation of the logical validity or invalidity of the inference was provided with the instructions. For each item, the premises were presented followed by the conclusion. Participants were asked to indicate if the argument was valid (the conclusion necessarily follows from the given statements) or invalid (the conclusion does not necessarily follow from the given statements).

In addition, participants were asked to provide their gender, age, grade level, religious denomination and ethnic group. Participants were also asked to indicate if they have previously studied logic, how conservative they believe their religion is compared to other denominations, and how religious they consider themselves to be. These questions concerning religion were not planned as a formal part of this thesis, but
may be used in subsequent analyses of how religiousness influences logical reasoning on issues regarding homosexuality.

**Attitudes Toward Homosexuality Scale.** Participants were given written instructions. Participants were told that the instrument is a survey of attitudes and beliefs.

The administration of the logic test and the Attitudes Toward Homosexuality Scale was varied so that half of the participants received the logic test first and half received the scale first.

**Data Analysis**

The following five scores were calculated on the 32 items with neutral content, in order to assess the effects of the truth-value of the conclusion on logic test scores.

1) **Number of errors on test items (out of 8) with invalid logic and true conclusions.**

2) **Number of errors on test items (out of 8) with valid logic and false conclusions.**

3) **Number of errors on test items (out of 8) with valid logic and true conclusions.**

4) **Number of errors on test items (out of 8) with invalid logic and false conclusions.**

5) **Scores on Formula 1 were then calculated using the four scores listed above.** Scores #1 and #2 represent errors due to a disagreement between the correct validity decision and the truth-value of the conclusion, where the participant bases their judgement of validity on the truth-value of the conclusion rather than on the logical
validity of the item. Because the correct validity decision and the truth-value of the conclusion are in agreement on the items used to calculate scores #3 and #4, it is unlikely that any errors committed on these items are due to the truth-value of the conclusion but instead are due to random error or inattention. Therefore, Formula 1 is the amount of distortion due to the truth-value of the conclusion. Formula 1, which can range between 0 and 16, was used to correct antihomosexual and prohomosexual distortion scores (Formulas 2 and 3, below), thus controlling for the general tendency to judge the validity of logical forms on the basis of the truth or falseness of the conclusions.

The following four error scores were calculated on the 32 items with homosexual content:

6) Numbers of errors on test items (out of 8) with valid logic and prohomosexuality conclusions.

7) Number of errors on test items (out of 8) with invalid logic and antihomosexuality conclusions.

8) Number of errors on test items (out of 8) with valid logic and antihomosexuality conclusions.

9) Number of errors on test items (out of 8) with invalid logic and prohomosexuality conclusions.

Alpha coefficients of reliability were calculated for each of these eight scales. Using scores #6 thru #9 the following two scores were calculated:
Raw distortion scores in an antihomosexual direction were calculated as (score #6 + score #7). These scores are equivalent to Formula 2 and can range between 0 and 16.

Raw distortion scores in a prohomosexual direction were calculated as (score #8 + score #9). These scores are equivalent to Formula 3 and can range between 0 and 16.

Using Formula 1 (p. 19, 23) for correction:

Distortions of logic in an antihomosexual direction (Formula 2) and prohomosexual direction (Formula 3) were correlated with attitudes toward homosexuality, controlling truth-value errors (Formula 1) by partial correlation.

**Hypothesis Tests**

If Hypothesis 1 is correct, corrected scores on Formula 2 will correlate positively with the Attitudes Toward Homosexuality Scale, but corrected scores on Formula 3 will be uncorrelated with it. If Hypothesis 2 is correct, corrected scores on Formula 2 will correlate positively with the Attitudes Toward Homosexuality Scale and corrected scores on Formula 3 will be correlated negatively with it.
Results

Logic Test

Table 1 shows the percentage of errors for each type of conclusion and logic form, not corrected for errors due to the truth-value of the conclusion. Error rates were much lower for the two valid logic forms than for the two invalid logic forms. As expected, with each logic form, error rates were higher when the correct validity decision and the truth-value of the conclusion did not agree, indicating that participants tended to respond based on the truth-value of the conclusion. For example, looking at the error rates for logic form 1, which is a valid form, we see that when the conclusion agreed with the validity judgement (i.e., was factually true) the error rate was 5.2%. However, when the conclusion disagreed with the validity judgement (i.e., was factually false) the error rate increased to 25.2%. And as Table 1 shows, the participants were quite poor in analyzing correctly the two invalid logical forms (Form 3 and Form 4).

Examining the items with prohomosexuality or antihomosexuality conclusions shows the error rates for these items were higher than the error rates for the factually true conclusions across all four logic forms. The error rate for the form 1 factually true items was 5.2%, as opposed to the error rates of 18.8% and 30.2% on the form 1 prohomosexuality and antihomosexuality items, respectively.
Table 1

Percentage of Logic Test Errors by Logic Form and Conclusion Type

<table>
<thead>
<tr>
<th></th>
<th>Form 1 (Valid)</th>
<th>Form 2 (Valid)</th>
<th>Form 3 (Invalid)</th>
<th>Form 4 (Invalid)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factually True</td>
<td>5.2</td>
<td>11.7</td>
<td>60.8</td>
<td>70.7</td>
</tr>
<tr>
<td>Factually False</td>
<td>25.2</td>
<td>34.1</td>
<td>46.4</td>
<td>51.4</td>
</tr>
<tr>
<td>Prohomosexuality</td>
<td>18.8</td>
<td>20.9</td>
<td>60.8</td>
<td>54.5</td>
</tr>
<tr>
<td>Antihomosexuality</td>
<td>30.2</td>
<td>32.8</td>
<td>51.1</td>
<td>56.1</td>
</tr>
</tbody>
</table>

Scale Reliabilities

Logic test. Table 2 lists the alpha levels for scores #1 to #4 and scores #6 to #9. The reliabilities ranged from .49 to .77 for the four scales used to calculate the effects the truth-value of the conclusion on error rates. The reliabilities of the four scales used to calculate errors due to the conclusion being either prohomosexual or antihomosexual in content ranged between .72 and .85. These reliabilities indicate that, on the whole, participants were consistent across the test in the number of errors that they made due to the truth-value of the conclusions and due to whether the conclusion was prohomosexual or antihomosexual. The low reliability for Score #3, based upon items with valid logic and true conclusions, was most likely due to the very low error rates on these items.
Table 2

Reliabilities of Error Rates for Each Type of Error

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score #1 -- Invalid Logic, factually true conclusions</td>
<td>.71</td>
</tr>
<tr>
<td>Score #2 -- Valid Logic, factually false conclusions</td>
<td>.81</td>
</tr>
<tr>
<td>Score #3 -- Valid Logic, factually true conclusions</td>
<td>.49</td>
</tr>
<tr>
<td>Score #4 -- Invalid Logic, factually false conclusions</td>
<td>.77</td>
</tr>
<tr>
<td>Score #6 -- Valid Logic, prohomosexuality conclusions</td>
<td>.72</td>
</tr>
<tr>
<td>Score #7 -- Invalid Logic, antihomosexuality conclusions</td>
<td>.76</td>
</tr>
<tr>
<td>Score #8 -- Valid Logic, antihomosexuality conclusions</td>
<td>.85</td>
</tr>
<tr>
<td>Score #9 -- Invalid Logic, prohomosexuality conclusions</td>
<td>.72</td>
</tr>
</tbody>
</table>

Attitudes Toward Homosexuality Scale. After reverse scoring half of the items on the Attitudes Toward Homosexuality Scale, the reliability analysis yielded an alpha of .91.

Hypothesis Tests

The partial correlations of antihomosexual distortion and prohomosexual distortion with ATH controlling for errors due to the truth-value of conclusions on neutral items were .44, \( p < .0001 \) and .16, \( p < .05 \), respectively. These correlations provide strong evidence that antihomosexual individuals distort logic to fit their conclusions beyond distortions due to the truth-value of the conclusions. They provide weaker, but significant, evidence that prohomosexual individuals do so as well. Using
the Williams' t-test, the absolute value of the antihomosexual distortion was significantly greater than the prohomosexual distortion, $t = 3.23, p < .001$. In order to confirm these results, a stricter test was performed by eliminating from the analysis those participants who made more than four errors due to truth-value distortions. Analysis performed on the data from the remaining 144 participants resulted in partial correlations of .38, $p < .001$ and .09, $ns$, for the antihomosexual and prohomosexual distortions.

Because of the difference in error rates between the valid and invalid forms of logic (see Table 1), additional analysis were run to examine the correlations of antihomosexuality distortion and prohomosexuality distortion with ATH on the valid and invalid forms of logic separately. For the logically valid items, error rates due to truth-value on the valid items (Forms 1 and 2) were used as the control for prohomosexual and antihomosexual distortions on the valid items. For the invalid items, error rates due to the truth-value on the invalid items (Forms 3 and 4) were used as the appropriate control for prohomosexual and antihomosexual distortions. However, these error scores due to the truth-value on the valid and invalid items correlated .65, $p < .001$, indicating essentially that the same participants were affected by the truth-value of the conclusions on the valid and invalid items. These analysis yielded partial correlations of .37, $p < .001$ for antihomosexuality distortion on valid items, .24, $p < .001$ for prohomosexuality distortion on valid items, .32, $p < .001$ for antihomosexuality distortion on invalid items, and .02, $ns$, for prohomosexuality distortion on invalid items. Using the Williams' t-test, the absolute value of antihomosexual distortion on the invalid items was significantly greater than the
prohomosexual distortion on the invalid items, $t = 4.19, p < .001$. The absolute value of antihomosexual distortion on the valid items was not significantly greater than the prohomosexual distortion on the valid items, $t = .73, \text{ns}$. In short, on the logically valid items where accuracy was generally high, both antihomosexual attitudes and prohomosexual attitudes led to distortion, in keeping with Hypothesis 2. But on the invalid items, where logical error rates were much higher, only antihomosexual attitudes produced logical distortion in the direction of attitudes, in keeping with Hypothesis 1.
Discussion

Overall, this study supports the findings of Thistlethwaite (1950), showing that people distort logical reasoning to fit their prejudices. Eliminating error caused by responding to the truth-value of the conclusions and including a measure of participant attitudes about the target group provided a more precise measure of how much attitudes toward homosexuality, whether prohomosexual or antihomosexual, produced parallel logical distortions in either a prohomosexual or antihomosexual direction. Overall, the results provide strong support for Hypothesis 1 and slight support for Hypothesis 2. Participants with negative attitudes about homosexuality tended to distort logic to a greater degree than did participants with positive attitudes about homosexuality.

The results replicate previous studies that show that the truth-value of the conclusion plays a significant role in the reasoning process. In cases where the correct validity judgement and truth-value of the conclusion disagreed, participants made more errors than when the correct validity judgement and the truth-value of the conclusion agreed. The effects of the truth-value of the conclusion were consistent across all of the logic forms tested. This result gives emphasis to the importance of controlling for the effects of truth-value of the conclusion when attempting to measure “reasoning distortion” that may be attributable to other causes (as in this case, attitudes toward homosexuality).

It is important to note that scores on the Attitudes Toward Homosexuality Scale showed the majority of participants scored at or below the midpoint of the scale. More participants scored at the lower end of the scale than at the upper end. As a group, the participants tended to have moderately positive attitudes toward homosexuality with a
mean score of 24.7 and a mode of 22, out of a possible 50. Does the presence of few people at the extreme upper end of the scale represent the attitudes of the general population or only the attitudes of this specific sample of college students who may have less extreme attitudes toward homosexuality, possible due to such factors as education, age, etc.? Additional research in this area using a more diverse sample would provide a clearer picture of the attitudes and distortion levels for a larger cross section of society.

As noted in the results, the accuracy level on the invalid syllogisms was much lower than for the valid syllogisms. The high correlation between distortion due to truth-value on the valid and invalid forms may indicate that both measure the same tendency to distort logic to fit the conclusion irrespective of the form being valid or invalid. The partial correlation of antihomosexuality distortion on valid forms with ATH indicates that high ATH predicts more errors in judging valid prohomosexuality conclusions as invalid, even beyond the tendency to make errors on valid forms due to the truth-value of the conclusion. The partial correlation of antihomosexuality distortion on invalid forms with ATH indicates that high ATH predicts more errors in judging invalid, antihomosexuality forms as valid, even beyond the tendency to make errors on invalid forms due to the truth-value of the conclusion. Both of these findings show that high ATH persons distort logical forms to fit their antihomosexuality beliefs, regardless of whether the conclusion was prohomosexual or antihomosexual, and whether the logical form involved was valid or invalid.

The partial correlation of prohomosexuality distortion on invalid forms with ATH indicates that there was no tendency for low ATH to be related to judging invalid,
prohomosexuality conclusions to be valid beyond the tendency to make errors on invalid forms due to the truth-value of the conclusion. Combining this result with the previous two correlations provided support for Hypothesis 1. However, the partial correlation of prohomosexuality distortion on valid forms with ATH shows that low ATH predicts more errors in judging valid, antihomosexuality conclusions as invalid, beyond the tendency to make errors on invalid forms due to the truth-value of the conclusion. In other words, people with prohomosexuality attitudes are more prone to reject valid, antihomosexuality conclusions, which is consistent with Hypothesis 2. Combining the two conflicting correlations of prohomosexuality distortion on valid forms and prohomosexuality distortion on invalid forms with ATH reduced the overall outcome for distortion in a prohomosexuality direction to insignificance, thereby providing only overall support for Hypothesis 1.

Why did the analysis of prohomosexuality distortion on valid and invalid forms yield conflicting results? One possible answer is that persons with prohomosexual attitudes (i.e., scored low the ATH scale) react with strong emotion only to antihomosexual conclusions, resulting in logical distortion. Because conclusions that are prohomosexual generate less emotional reaction, they are able to still examine the logic of these items objectively. However, participants who score high on the ATH scale (i.e., have more negative attitudes toward homosexuality) may react emotionally and be less capable of making an objective decision with either prohomosexuality or antihomosexuality conclusions, distorting both in the direction of their attitudes. However, the role of emotional arousal as the mediating cause of the distortion of logic is as yet untested. This issue should be addressed in future studies.
References


Appendix A

A Test of Reasoning Ability -- Form I

Instructions

The following test contains a series of items designed to test reasoning ability. Some of the items will be easy. Some will be more difficult. You will notice that approximately half of the items examine your logical reasoning in issues concerning homosexuality and homosexual persons. In each case, two or three statements are given, followed by a conclusion which begins, “Therefore…”

Your task is to determine whether or not each conclusion necessarily follows from statements that are given. **You are to assume that the given statements are true, even if you think they are not.**

**If the conclusion necessarily follows from the given statements, the logic is valid. If so, mark the item “valid” by circling the “V.”**

**If the conclusion does not necessarily follow from the given statements, the logic is invalid. When this is the case, mark the item “invalid” by circling the “I.”**

Here are four examples of the kinds of items you will see.

Example:  

**Given:**   If coal pollutes, it is illegal to mine coal in Kentucky.  
Coal pollutes.  

V I  Therefore:  It is illegal to mine coal in Kentucky.  

The conclusion is valid. “It is illegal to mine coal in Kentucky” necessarily follows from the given statements (even if it is factually untrue).

Example:  

**Given:**   If coal is important to Kentucky’s economy, then many Kentuckians depend on coal for their living.  
If many Kentuckians depend on coal for their living, then much coal is mined in Kentucky.  
Coal is important to Kentucky’s economy.  

V I  Therefore:  Much coal is mined in Kentucky.  

This conclusion, “Much coal is mined in Kentucky” is also valid, a necessary conclusion from the given statements (and, in this case, factually true as well).

Example:  

**Given:**   If more electricity is made from coal than from dams, burning coal pollutes the air.
More electricity is not made from coal than from dams.

V I Therefore: Burning coal does not pollute the air.

This conclusion, “Burning coal does not pollute the air” is logically invalid. Burning coal might pollute the air even if more electricity is made from dams.

Example: Given: If Kentucky needs to generate more electricity, more coal should be mined in Kentucky. More coal should be mined in Kentucky.

V I Therefore: Kentucky needs to generate more electricity.

This conclusion, “Kentucky needs to generate more electricity” is logically invalid. There might be reasons other than generating electricity for mining more coal.

You will be timed, so proceed as quickly as you can after the starting signal is given.

At the signal “Begin work” proceed immediately to the test on the following pages. Do not omit any items. Make a judgment on each item, whether you are sure or not. Do not turn back. Keep going until you finish.

Please answer the following questions now.

My gender is (check one) ___ male ___ female

My classification is (check one):
___ Freshman ___ Sophomore
___ Junior ___ Senior
___ Graduate Student

My religious denomination is (write in name or “none”): ____________________________.

Compared to other denominations, my church is (check one):
___ Very Conservative ___ Somewhat Conservative
___ Moderate ___ Somewhat Liberal ___ Very Liberal

Please rate how religious you are using the following scale (circle a number from 1 to 9):

not religious at all 1 2 3 4 5 6 7 8 9 very religious
My ethnic group is (check one):

___ Caucasian  ___ African-American  ___ Hispanic  ___ Asian  ___ Other

Age: _____

I have taken a course in logic (check one)  ___ yes  ___ no

DO NOT TURN THIS PAGE UNTIL THE SIGNAL TO BEGIN IS GIVEN
1. Given: If vegetables are good for you, then people should eat more vegetables.
   Vegetables are good for you.
   Therefore: People should eat more vegetables.

2. Given: If television is a popular form of entertainment, then many people own TV’s.
   If many people own TV’s, then many people have TV remote controls.
   Television is a popular form of entertainment.
   Therefore: Many people have TV remote controls.

3. Given: If the boat could sink, then children need to wear life jackets while boating.
   The boat could not sink.
   Therefore: Children do not need to wear life jackets while boating.

4. Given: If the homosexuals on the team are quiet about their homosexuality, the homosexuals on the team should have equal playing time.
   The homosexuals on the team are not quiet about their homosexuality.
   Therefore: The homosexuals on the team should not have equal playing time.

5. Given: If betting on horse races is legal in Kentucky, then many Kentucky residents bet on horse races.
   Many Kentucky residents bet on horse races.
   Therefore: Betting on horse races is legal in Kentucky.

6. Given: If homosexuality is immoral, then homosexual characters should not be included in TV programming.
   Homosexuality is not immoral.
   Therefore: Homosexual characters should be included in TV programming.

7. Given: If the Internet contains massive amounts of information, then people with access to the Internet can get many facts.
   The Internet contains massive amounts of information.
   Therefore: People with access to the Internet can get many facts.

8. Given: If football is not a contact sport, then football is safer than other sports.
   If football is safer than other sports, then football injuries are rare.
   Football is not a contact sport.
   Therefore: Football injuries are rare.
9. Given: If California has more tourists than Alaska, then California is warmer than Alaska.
   California does not have more tourists than Alaska.
   V I Therefore: California is not warmer than Alaska.

10. Given: If homosexuality is a chosen way of life rather determined by one’s genes, then homosexuals should not have the same rights as heterosexuals.
     If homosexuals should not have the same rights as heterosexuals, then laws should not be written specifically to protect homosexual rights.
     Homosexuality is a chosen way of life rather determined by one’s genes.
     V I Therefore: Laws should not be written specifically to protect homosexual rights.

11. Given: If Mexico has a stronger military than does the United States, then Mexico is larger than the United States.
     Mexico is larger than the United States.
     V I Therefore: Mexico has a stronger military than does the United States.

12. Given: If most homosexuals choose to be homosexuals, then laws do not need to be passed to protect their rights.
     Laws do not need to be passed to protect their rights.
     V I Therefore: Most homosexuals choose to be homosexuals.

13. Given: If beef producers claim that chicken has more fat than does beef, then chicken has more fat than beef.
     Beef producers do not claim that chicken has more fat than does beef.
     V I Therefore: Chicken does not have more fat than beef.

14. Given: If homosexuals are deceptive, people need to be careful in dealing with homosexuals.
     Homosexual individuals are not deceptive.
     V I Therefore: People don’t need to be careful in dealing with homosexual.

15. Given: If a VCR is larger than a home theater television, then a home theater television set costs more than a VCR.
     A home theater television set costs more than a VCR.
     V I Therefore: A VCR is larger than a home theater television.
16. Given:  If homosexual males like watching craft shows on TV, then homosexual males are more feminine than are heterosexual males.
Homosexual males do not like watching craft shows on TV.
V I Therefore:  Homosexual males are not more feminine than are heterosexual males.

17. Given:  If you must first know algebra to understand calculus, then it is wise to take algebra before calculus.
If it is wise to take algebra before calculus, then the majority of students should take algebra before taking calculus.
You must first know algebra to understand calculus.
V I Therefore:  The majority of students should take algebra before taking calculus.

18. Given:  If John, a homosexual male, believes in Christ, then the church should accept his homosexuality.
John, a homosexual male, believes in Christ.
V I Therefore:  The church should accept his homosexuality.

19. Given:  If the highway department plans carefully, then road repair projects are completed quickly.
If road repair projects are completed quickly, then road repair is inexpensive.
The highway department plans carefully.
V I Therefore:  Road repair is inexpensive.

20. Given:  If fans spend money on auto racing tickets and merchandise, then auto racing is a popular sport.
Fans do not spend money on auto racing tickets and merchandise.
V I Therefore:  Auto racing is not a popular sport.

21. Given:  If General Motors (GM) needs a stable work force, then GM needs workers who are loyal.
If GM needs workers who are loyal, then General Motors should hire as few homosexual persons as possible.
General Motors (GM) needs a stable work force.
V I Therefore:  General Motors should hire as few homosexual persons as possible.

22. Given:  If homosexuals are by nature extraverted, then homosexuals should be encouraged to run for Congress.
Homosexuals are not by nature extraverted.
V I Therefore:  Homosexuals should not be encouraged to run for Congress.
   Few children take swimming lessons.  
   Therefore: Few children enjoy swimming.

24. Given: If homosexual couples are not Christians, then they should not be allowed to adopt children.  
   Homosexual couples are not Christians.  
   Therefore: Homosexual couples should not be allowed to adopt children.

25. Given: If most college students buy their own textbooks, then they spend little money on textbooks.  
   Most college students buy their own textbooks.  
   Therefore: They spend little money on textbooks.

26. Given: If homosexual males are more feminine, then they are good at home decorating.  
   Homosexual males are good at home decorating.  
   Therefore: Homosexual males are more feminine.

27. Given: If medieval society regarded homosexuality as normal, modern society should accept homosexuality.  
   Medieval society did not regard homosexuality as normal.  
   Therefore: Modern society should not accept homosexuality.

28. Given: If February is shorter than April, then February is warmer than April.  
   February is shorter than April.  
   Therefore: February is warmer than April.

29. Given: If gay rights groups have enough money, then they should be allowed to have a day honoring homosexuals at Disneyland.  
   Gay rights groups have enough money.  
   Therefore: Gay rights groups should be allowed to have a day honoring homosexuals at Disneyland.

30. Given: If a Corvette is more expensive than a Saturn, then car payments for a Corvette are higher than for a Saturn.  
   If car payments for a Corvette are higher than for a Saturn, then you will have less money to spend on other items if you buy a Corvette instead of a Saturn.  
   A corvette is more expensive than a Saturn.  
   Therefore: You will have less money to spend on other items if you buy a Corvette instead of a Saturn.
31. Given: If homosexuals are the same as everyone else, then their behavior is not distinguishable from the behavior of others.
    Their behavior is not distinguishable from the behavior of others.
    Therefore: Homosexuals are the same as everyone else.

32. Given: If homosexuals are good citizens, then they should not be denied equal job opportunities.
    Homosexuals are good citizens.
    Therefore: Homosexuals should not be denied equal job opportunities.

33. Given: If the cost of a college education is increasing, then parents who pay for their children’s college education need to save more money. If parents who pay for their children’s college education need to save more money, then they will have less money to save for retirement. The cost of a college education is increasing.
    Therefore: Parents who pay for their children’s college education will have less money to save for retirement.

34. Given: If homosexuals are hard workers, then they should have the same opportunities as other workers. Homosexuals should have the same opportunities as other workers.
    Therefore: Homosexuals are hard workers.

35. Given: If California is closer to Kentucky than is Tennessee, then it takes less time to drive to California than to drive to Tennessee. California is closer to Kentucky than is Tennessee.
    Therefore: It takes less time to drive to California than to drive to Tennessee.

36. Given: If homosexuals are at a high risk for contracting AIDS, then they are more likely to transmit AIDS to others. If homosexuals are more likely to transmit AIDS to others, then they should be excluded from certain occupations. Homosexuals are at a high risk for contracting AIDS.
    Therefore: Homosexuals should be excluded from certain occupations.
37. Given: If country music is better than other types of music, then more country music CD’s are sold than for any other kind of music. If more country music CD’s are sold than for any other kind of music, then everyone who likes music enjoys listening to country music.

Country music is better than other types of music.

Therefore: Everyone who likes music enjoys listening to country music.

38. Given: If most homosexuals are nice people, then homosexual unions should be as legal as marriage.

Most homosexuals are nice people.

Therefore: Homosexual unions should be as legal as marriage.

39. Given: If homosexual students have a right to demonstrate at high schools, then the schools should protect homosexual students from violence.

The schools should protect homosexual students from violence.

Therefore: Homosexual students have a right to demonstrate at high schools.

40. Given: If Kentucky is a place where tobacco is grown, the percent of people who smoke in Kentucky is higher than the national average.

The percent of people who smoke in Kentucky is higher than the national average.

Therefore: Kentucky is a place where tobacco is grown.

41. Given: If the majority of students on campus do not approve of Lambda (the gay students’ organization), then Lambda should not be recognized by Western as an official student organization.

The majority of students on campus do not approve of Lambda (the gay students’ organization).

Therefore: Lambda should not be recognized by Western as an official student organization.

42. Given: If gasoline is an economical fuel, then gasoline is the most common fuel used in automobiles.

Gasoline is an economical fuel.

Therefore: Gasoline is the most common fuel used in automobiles.

43. Given: If most homosexuals live decent lives, then you should be willing to vote for a homosexual candidate.

You should be willing to vote for a homosexual candidate.

Therefore: Most homosexuals live decent lives.
44. Given: If homosexuality can't be changed, laws are needed to protect homosexual persons from discrimination. Homosexuality can be changed.

V I Therefore: Laws are not needed to protect homosexual persons from discrimination.

45. Given: If exercise increases depression, people should not exercise. Exercise does not increase depression.

V I Therefore: People should exercise.

46. Given: If homosexuals have the same mental and physical abilities as heterosexuals, then they can perform the same jobs as heterosexuals. If homosexuals can perform the same jobs as heterosexuals, then they should be allowed to serve in the military. Homosexuals have the same mental and physical abilities as heterosexuals.

V I Therefore: Homosexuals should be allowed to serve in the military.

47. Given: If all dinosaurs died before humans existed, then no human ever saw a dinosaur. All dinosaurs died before humans existed.

V I Therefore: No human ever saw a dinosaur.

48. Given: If homosexuals are at risk for contracting AIDS, homosexuals should not teach in public schools. Homosexuals are at risk for contracting AIDS.

V I Therefore: Homosexuals should not teach in public schools.

49. Given: If health insurance is cheap, then every citizen has health insurance. Health insurance is not cheap.

V I Therefore: Not every citizen has health insurance.

50. Given: If homosexuals perform as well as heterosexuals on the job, then they should be treated as equals. If homosexuals should be treated as equals, then homosexuals’ sexual orientation should not influence hiring decisions. Homosexuals perform as well as heterosexuals on the job.

V I Therefore: Homosexuals’ sexual orientation should not influence hiring decisions.
51. Given: If computers are not getting faster, then computer viruses can cause serious problems.
Computers are getting faster.
V I Therefore: Computer viruses cannot cause serious problems.

52. Given: If homosexuality is a perversion, then children in the community are not safe from homosexuals.
Children in the community are not safe from homosexuals.
V I Therefore: Homosexuality is a perversion.

53. Given: If Kentucky requires a drivers license, then driving safety is important.
Driving safety is important.
V I Therefore: Kentucky requires a drivers license.

54. Given: If people can’t choose their sexual orientation, then homosexuals need legislation to protect their rights.
If homosexuals need legislation to protect their rights, then businesses should hire homosexual employees.
People can’t choose their sexual orientation.
V I Therefore: Businesses should hire homosexual employees.

55. Given: If you are an expert driver, your tires will last for 100,000 miles.
You are not an expert driver.
V I Therefore: Your tires will not last for 100,000 miles.

56. Given: If animals never have homosexual sex, homosexuality in humans is immoral.
Animals sometimes have homosexual sex.
V I Therefore: Homosexuality in humans is not immoral.

57. Given: If the winter months in Kentucky are warmer than the summer months, then you should wear warmer clothing in the summer than in the winter.
The winter months in Kentucky are warmer than the summer months.
V I Therefore: You should wear warmer clothing in the summer than in the winter.

58. Given: If homosexuality has a genetic component, then it is a naturally occurring trait.
If homosexuality is a naturally occurring trait, then parents should not be concerned that their child is a homosexual.
Homosexuality has a genetic component.
V I Therefore: Parents should not be concerned that their child is a homosexual.
59. Given: If seat belts don’t save lives, laws that require citizens to wear seat belts should be abolished. Laws that require citizens to wear seat belts should be abolished.
   V I Therefore: Seat belts don’t save lives.

60. Given: If homosexuality is opposed by Jewish and Christian teachings, then it is immoral. If homosexuality is immoral, then homosexual behavior should be illegal. Homosexuality is opposed by Jewish and Christian teachings.
   V I Therefore: Homosexual behavior should be illegal.

61. Given: If the weather is hot during the summer, then people spend more time indoors in the summer. If people spend time indoors in the summer, then people travel less during the summer. The weather is hot during the summer.
   V I Therefore: People travel less during the summer.

62. Given: If homosexuals abuse property, landlords should be allowed to not rent to homosexuals. Homosexuals abuse property.
   V I Therefore: Landlords should be allowed to not rent to homosexuals.

63. Given: If employee turnover costs companies money, then companies work hard to reduce turnover. Companies work hard to reduce turnover.
   V I Therefore: Employee turnover costs companies money.

64. Given: If homosexual persons are sinful, then they deserve the treatment they get. Homosexual persons deserve the treatment they get.
   V I Therefore: Homosexual persons are sinful.
Appendix B

A Survey of Personal Attitudes and Beliefs

The following questions ask for your opinions on a range of personal qualities and social issues. Your participation is voluntary, and your responses will be kept private. This study is being conducted by Ms. Jeanette Myers and Dr. Sam McFarland of the Department of Psychology, Western Kentucky University.

In completing the questionnaire, it is important that you:

-- Make no marks on the questionnaire. These will be reused.
-- Write a code of letters or numbers (not your name) on the space marked “Name” on both scantron sheets. This will enable us to keep your two questionnaires together.
-- Respond to every question. If you change an answer, erase cleanly.
-- Mark your answers darkly with a pencil on the scantron sheet.

Please read each statement and rate your agreement or disagreement. Please mark the appropriate letter on the answer sheet using the following scale:

A = I strongly disagree with this statement.
B = I generally disagree with this statement.
C = I am undecided or neutral toward this statement.
D = I generally agree with this statement.
E = I strongly agree with this statement.

1. I often have tender, concerned feelings for people less fortunate than me.
2. I sometimes find it difficult to see things from the “other guy’s” point of view.
3. Sometimes I don’t feel very sorry for other people when they are having problems.
4. I try to look at everybody’s side of a disagreement before I make a decision.
5. When I see someone being taken advantage of, I feel protective toward them.
6. I sometimes try to understand my friends better by imagining how things look from their perspective.
7. Other people’s misfortunes do not usually disturb me a great deal.
8. If I’m sure I’m right about something, I don’t waste much time listening to other people’s arguments.
9. When I see someone being treated unfairly, I sometimes don’t feel very much pity for them.
10. I am often quite touched by things that I see happen.
11. I believe that there are two sides to every question and try to look at them both.
12. I would describe myself as a pretty soft-hearted person.
13. When I’m upset at someone, I usually try to “put myself in his shoes” for a while.
14. Before criticizing somebody, I try to imagine how I would feel if I were in their place.
15. If certain groups stayed in their place, we would have fewer problems.
16. It’s probably a good thing that certain groups are at the top and other groups are at the bottom.
17. Inferior groups should stay in their place.
18. Sometimes other groups must be kept in their place.
19. It would be good if groups could be equal.
20. Group equality should be our ideal.
All groups should be given an equal chance in life.
We should do what we can to equalize conditions for different groups.
I support increased social equality.
We would have fewer problems if we treated people more equally.
We should strive to make incomes as equal as possible.
It would be best for everyone if the proper authorities censored magazines and movies to keep trashy material away from the youth.
There is nothing wrong with premarital sexual intercourse.
The facts on crime, sexual immorality, and the recent public disorders all show we have to crack down harder on deviant groups and troublemakers if we are going to save our moral standards and preserve law and order.
There is nothing immoral or sick about somebody’s being a homosexual.
Some of the worst people in our country nowadays are those who do not respect our flag, our leaders, and the normal way things are supposed to be done.
In these troubled times laws have to be enforced without mercy, especially when dealing with the agitators and revolutionaries who are stirring things up.
Atheists and others who have rebelled against the established religions are no doubt every bit as good and virtuous as those who attend church regularly.
There is absolutely nothing wrong with nudist camps.
The real keys to the "good life" are obedience, discipline, and sticking to the straight and narrow.
It is best to treat dissenters with leniency and an open mind, since new ideas are the lifeblood of progressive change.
The biggest threat to our freedom comes from those who are out to destroy religion, ridicule patriotism, corrupt the youth, and in general undermine our whole way of life.
I would not mind having homosexual friends.
I won’t associate with known homosexuals if I can help it.
I would look for a new place to live if I found out that my roommate was gay.
Homosexuals should be kept separate from the rest of society (i.e., separate housing, restricted employment).
Two individuals of the same sex holding hands or displaying affection in public is revolting.
I would not mind being employed by a homosexual.
The increasing acceptance of homosexuality in our society is aiding in the deterioration of morals.
I would not decline membership in an organization just because it had homosexual members.
If I knew that someone were gay, I would still go ahead and form a friendship with that individual.
If I were a parent, I could accept my son or daughter being gay.
If we don’t watch out, Asians will control our economy and we will be their cheap workers.
We should take in more refugees (Asians, Africans, Bosnians, etc.) fleeing from repressive governments.
It is good to live in a country where there are a growing number of minorities, such as Blacks, Asians and Hispanics.
“Foreign” religions like Buddhism, Hinduism, and Islam are just as good as Christianity, all things considered.