

The Effects of Vocal Characteristics on Perceived Gender and Sexual Orientation

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Vocal Characteristics

The simple tone and pitch of a person's voice can lead to perceptions of either masculine or feminine stereotyping. Masculine voices are perceived as lower with less voice fluctuation, while feminine voices are higher pitched with a greater range of voice fluctuation. If an individual has a gender neutral name, the listener can infer from the speaker's voice whether it is a male or female (Ko, Judd, & Blair (2006). When a person's gender is inconsistent with the typical voice pitch of their gender, it may influence judgments of the person's sexual orientation. Munson, McDonald, DeBoe, and White (2006) found differences in the frequencies of vowels between homosexual and heterosexual males, and participants; judgments of men's sexual orientation were influenced by differences in two different vowel frequencies. Research performed by Drew, McKenzie, and Vasey (2008) studied pitch, frequency, and vowels of speech between heterosexual and homosexual men and women; interestingly, significant differences were found in the frequencies in vowels produced by homosexuals and heterosexuals. These differences in vowels were of higher pitch and were more emphasized for homosexuals, whereas heterosexuals produced vowels at a lower frequency and were less emphasized in speech.

The occurrence of stereotypes concerning femininity/masculinity and homosexuality in males through one's voice ultimately leads to certain perspectives to be given. For instance, males who display more femininity (higher pitch, broader fluctuation) through their voice are perceived to have more warmth, and those who display more masculinity (lower pitch, less fluctuation) through their voice are perceived to have more competence. (Ko, S.J., Judd, C.M., Stapel, D.A. 2009). A study found that when the frequency of a male's voice was lowered in certain ways that they males were perceived as being more dominant men than those with higher frequencies (Puts, D.A., Hodges, C.R., Cardenas, R.A., Gaulin, S.C., 2007).

Blashill and Powlishta (2009) found that males rated other feminine target males more negatively than masculine target males, and that gay target males were rated more negatively than heterosexual and unspecified sexual orientation males. The study concluded that femininity and homosexuality act independently in the negative ratings of men. One study found that participants judged homosexual men to sound less masculine than heterosexual men, which was correlated with perceived sexual orientation. It also found that different set of acoustic measures predicted perceived sexual orientation and perceived masculinity/femininity (Munson, 2007). Another recent study showed that homosexual judgments were significantly associated with higher peak frequency values and longer duration values. (Linville, S.E., 1998)

Based upon a person's self-concept of masculinity/femininity, such as determined through Sandra Bem's Sex Role Inventory, the person may easily stereotype an individual into a feminine/homosexual category based upon their verbal cues and actions. We perceive that highly masculine males, according to a BSRI self-evaluation, will have more negative views of masculine voices with feminine fluctuations. A study by Parrott (2009) found that self-identified heterosexual males who were subject to viewing homosexual behavior were found to be sexually prejudice, and caused an increase in anger towards homosexual males. We are interested in identifying whether or not this sexual prejudice is also apparent with a variance in a person's voice pitch (masculine or feminine), combined with vowel fluctuation (masculine or feminine) that correlates with the stereotyping of masculinity of a target male. We hypothesize that a masculine voice with masculine vowel fluctuation, and a feminine voice with feminine vowel fluctuation will not be classified as homosexual, or produce any negative stereotypes. We hypothesize that a feminine voice with masculine vowel fluctuation will not be considered homosexual and will not produce any significant negative stereotypes, however, a masculine voice with feminine vowel fluctuation will be classified as homosexual and will produce a significant negative stereotype. We believe it is not the pitch of the

voice that will be the main cause of the negative stereotype, but the vowel fluctuation of the voice that subjects base their stereotypes on.

Method

Materials

Throughout this study a multitude of materials were required in order to complete the study. Materials included six individuals, three males and three females, to make vocal recordings. A representative of the Hanover College Communications Department, a recording studio, two computers with Windows operating system, a microphone, and Adobe Premier Pro and Adobe Sound Booth programs were used to record the individuals, and to copy, alter, and create new audio files. There were six audio conditions in which the audio has not been altered; three were of a woman reading a script, three were of a man reading a script. The other six conditions consisted of audio that was altered; three were males whose voice was altered to sound like that of a woman, and three conditions were of women whose voice was altered to sound like that of a man. Each of the twelve pieces of audio had the exact same script, which was a dialogue of from the target subject "Alex." This dialogue consisted of Alex talking about his/her interests; the entire dialogue was gender neutral.

It should be noted on the manner in which the audio pieces were obtained. A member of Hanover College's Communications department assisted the researchers in recording, copying, and editing the audio from the six original speakers, and creating six additional pieces of audio. The six speakers were brought to a recording studio in the Communications department of Hanover College, where they read the script into a microphone, using the program Adobe Premiere Pro. The audio file was transferred to the program Adobe Sound Booth, where it was altered; by slightly stretching or shrinking the overall length of the file the speakers' voice pitch would become higher or lower. Also by using the Bass Changer settings, the bass in the speaker's voice could be raised or lowered; the

Pitch Shifter setting could also alter the over pitch of the speaker's voice. Because there no individual's voice is exactly the same as another individual's, it is impossible to use any sort of constant variable change between a male's and female's voice or vise-versa. The changes made between changing a male's to a female's voice and a female's to a male's voice was therefore made at the discretion of the researchers and the member of the Communications department. After each file was finished, it was exported into an .mp3 format for future use.

The survey had questions concerning Alex, and all questions were answered using a 6-point Likert scale; where 1 is to Definitely Disagree and 6 is to Definitely Agree. A 6-point Likert scale did not allow the participants to make a neutral decision for any question. There were three types of questions asked: Measures to Assess Attention, Social-Distance Measures, Measures of Masculinity/Femininity, and Measures to Assess Homosexuality. Measures to Assess Attention were questions based on Alex's script to make sure that the participants were paying attention to the audio. An example of a Measure to Assess Attention question was: "Alex has three siblings." Measures of Social-Distance were questions to measure the comfortability that the participants have with Alex. An example of a Social-Distance Measures question was: "I would be interested in getting to know Alex." Measures of Masculinity/Femininity were questions in which the participants assess how masculine and how feminine Alex was. An example of a Measure of Masculinity/Femininity was: "Alex would be interested in refurbishing as old car." Measure to Assess Homosexuality was a question that measured the participant's view of Alex's level of homosexuality. The question for the Measure to Assess Homosexuality was: "Alex is a homosexual."

The Bem Sex Role Inventory (BSRI) (Bem, 1972) is designed to measure the participants' self-concept as masculine or feminine. The BSRI has 60 questions, and gave both a masculinity and femininity score to the participants. The reason for giving the BSRI to the participants was to assess their own levels of masculinity and femininity, and how it affected their views on Alex.

The Demographic survey that participants filled out was concerned with Age, Gender, Race, and Occupation.

Participants

The participants of this study were acquired from various methods, including sign-up sheets, email solicitations, and through John Krantz's "Experiments on the Net" webpage where this study was posted. There were 44 participants. The participants consisted of 24 males, and 20 females; of these participants, 99% of them were Caucasian with the other 1% being Arab and undisclosed. Ages of the participants ranged from 19-52 years. The average age was 22 years, and the median age was 21 years.

Procedure

The study was taken electronically online. The study began with an Informed Consent, and after the participants agree to the Consent, they were sent to an audio test page that allowed them to adjust the volume of their speakers/headphones. The participants were then subject to one of twelve possible audio conditions. After being subject to the audio condition, participants filled out a survey, demographics, and the Bem Sex Role Inventory. After the completion of the BSRI, the participants were shown a Debriefing form, and then notified that the study had come to a completion. All data was directly sent to and saved online to the private server of Dr. John Krantz of the Hanover College Psychology department.

Results and Discussion

We predicted the pitch of the voice would influence the participant's gender identification of the speaker. It was predicted that the characteristics of the voice will determine the participant's sexual orientation identification of the speaker. Lastly, it was predicted that a voice that

is of deeper pitch, which also consists of feminine characteristics, will be perceived as a homosexual male.

After having completed the data collection for the study, the data was analyzed. A Factorial ANOVA, or 2x2 ANOVA between Voice Pitch (masculine or feminine) and Voice Characteristics (masculine or feminine) will be used to analyze the data. Multiple regressions will also be used. Ratings of Alex will be regressed on voice pitch and voice characteristics, and all possible interactions of those three factors.

The immediate indications from the data were a limitation in the number of participants. Not only were the participants limited to only 44, but the BSRI results of the participants were not able to be used. The BSRI has four possible score that can be given to the participant; all of the participants in this study were averaged as “Undifferentiated” meaning that they were neither highly masculine nor highly feminine.

In order to fully comprehend the following graphs, a few variable need to be defined. First is the variable speakSex; speakSex is the gender of the original audio clip, regardless of whether the audio was changed to the opposite gender or not. Another important variable is speakPitch. It is the pitch of the clip: either masculine (if male voice or transformed female voice) or feminine (if female voice or transformed male voice). For example, if Bob came in and recorded his voice, and then it was altered to sound like a woman, the speakSex would be male and the speakPitch would be female.

Judgments of Speaker's Sex from Speaker's Sex and Voice Pitch

A crucial piece of information that was discovered in the results comes from *Figure 1* below. *Figure 1* shows how the participants in the study rated the speaker's gender. The variable on the left-hand side 'Alex.is.male' was the question, and the participants rated this on a 6-point Likert scale; 1 being Completely Feminine, and 6 being Completely Masculine. From the graph it is quite obvious

that the participants were able to differentiate between the genders of the speakers. Even when a male voice was altered to sound like a female voice, and when a female voice was altered to sound like a male voice, the participants were still able to distinguish between the genders. This was very detrimental to the study; it means that the participants were not influenced by the alterations of the audio files. According to *Figure 1* there was a main effect for speakSex, but no interaction.

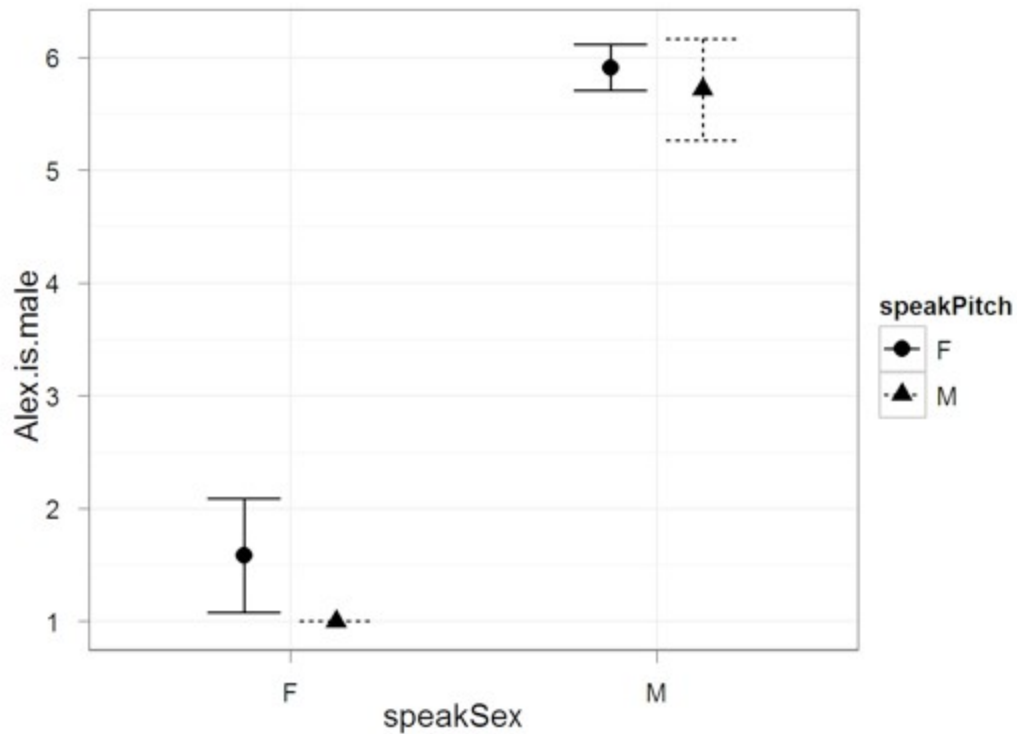


Figure 1

Judgments of Sexual Orientation from Speaker Sex and Voice Pitch

Another important aspect of the study was to determine whether the altering of a person’s voice would lead to the individual being perceived as homosexual. *Figure 2* illustrates these results. The variable on the left-hand side of the graph, ‘homosexual’ is the level to which the participants rated the speaker as a homosexual. 1 on the Likert scale indicates the response as Not At All Homosexual, and 6 on the Likert scale indicates the response as Very Much Homosexual. According to the graph, there were no main effects, and no interactions; all F ’s < 2 . In fact, there is very little change between any of the conditions; the levels of homosexuality were very close to one another. Overall, participants’ judgments about the target’s sexual orientation were not systematically affected by the speaker’s gender or voice pitch.

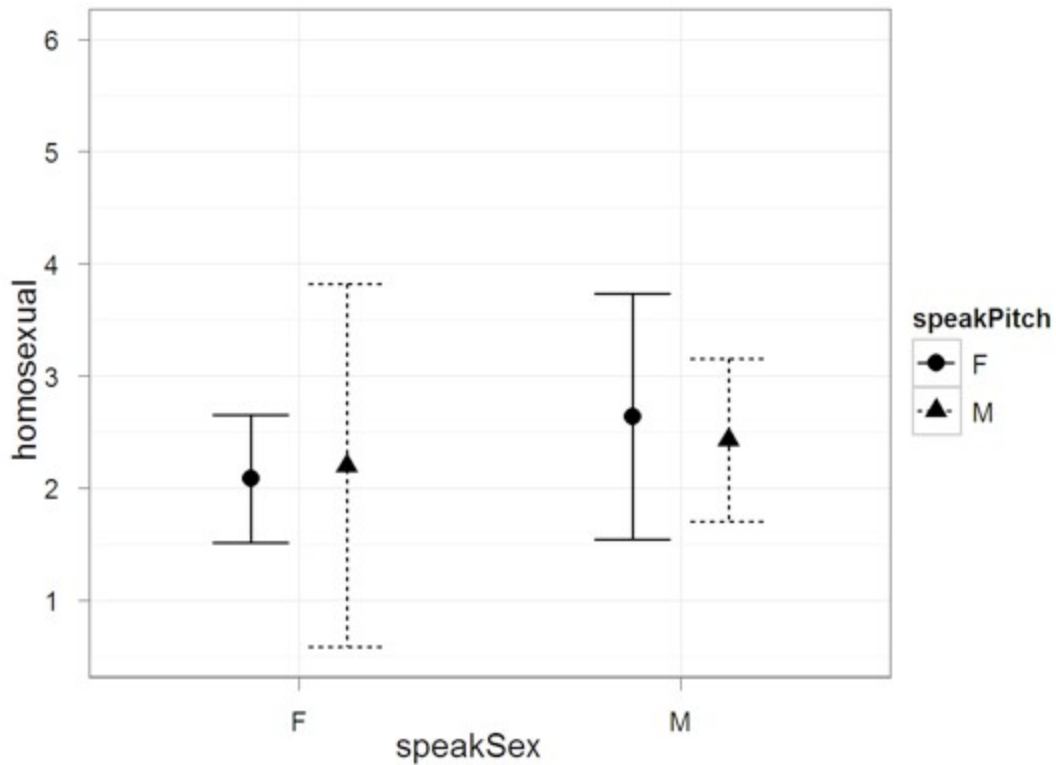


Figure 2

Judgments of Sexual Orientation from Perceived Masculinity/Femininity and Speaker Sex

Multiple regressions testing was done through predicting homosexuality from speaker sex, perceived masculinity or femininity of speaker, and their interaction. The multiple regressions testing did yield some interesting results. *Figure 3* shows the interaction between the ratings of Masculinity/Femininity with ratings of Homosexuality. On the Masc_Fem scale at the bottom of the graph, 1 is Completely Feminine, and 6 is Completely Masculine. The red line represents the average of the results from the female speakers, and the blue line represents the average of the results from the male speakers. Obviously, there is a large difference between the two; an interaction, $p = .02$.

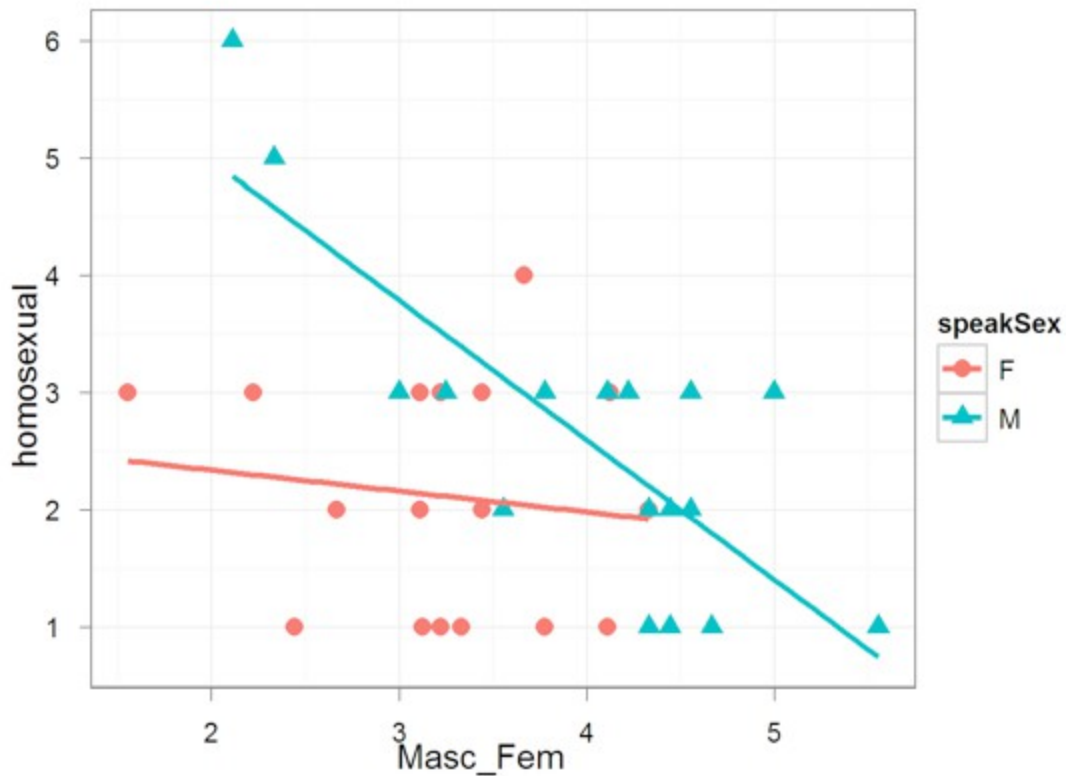


Figure 3: Interaction, $p = .02$

Judgments of Liking and Perceptions of Homosexuality

Based on research by Blashill and Powlishta (2009) who found that homosexual speakers were less liked than that of heterosexual speakers, a correlation was done between the variables of Liking and Homosexual as illustrated in *Figure 4*. Liking represent answers form the Social-Distance Measures that were done in the study’s survey; the answers are averages of questions such as: “Would you want to get to know Alex?” “Could you be friends with Alex?” On the scale, 1 represents Not Liked At All and 6 represents Liked Very Much. The Homosexual rating is again, a rating of how homosexual an individual is perceived. 1 being not homosexual at all, and 6 being very much homosexual. *Figure 4* shows a negative correlation, $r = -.464$, $p = .002$, between Liking and Homosexual. This means that the more an individual was perceived as homosexual, the less liked

they were by the participants. Blashill and Powlishta (2009) found similar results in their study; that targets are not only being classified as homosexual or not based on their voice, but that those judgments have consequences for how they are evaluated.

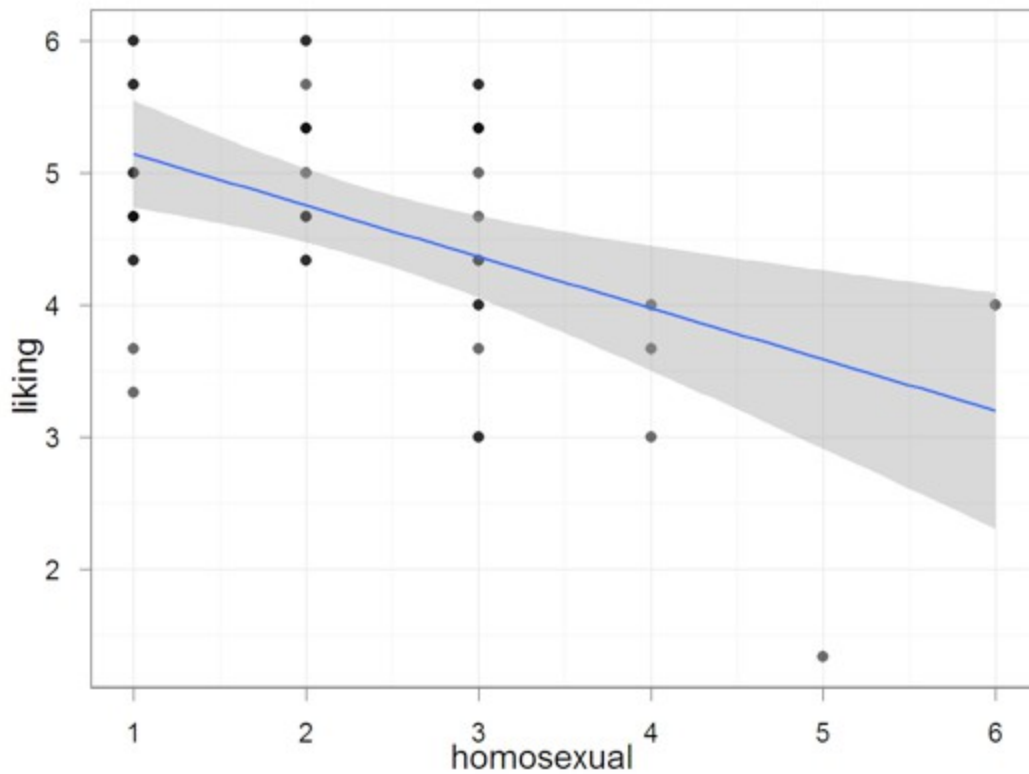


Figure 4

$r = -.464, p = .002$

Limitations

The major limitation of the study was the failure to adequately modify male and female voices to make their voices ambiguous with regards to gender. A post-hoc analysis of the voices revealed that the pitch had only been modified by between 20 and 50 Hz, whereas typical gender differences in pitch are around 100 Hz. Another major limitation of the study was the sample size and quality.

Conclusion

At the end of data analysis it was unfortunately concluded that none of the proposed hypotheses were supported. The major reason for this is explained through *Figure 1*. Had the

participants not been able to determine the true gender of the speaker; had the pitch manipulations not failed to influence the participants' gender inferences the results may have been different as the study depended upon the target's gender being more ambiguous when their sex and pitch were inconsistent.

Interestingly, what was found was that judgments of a speaker's sexual orientation were related to judgments of their masculinity and femininity, but that this relationship held only for male targets (*Figure 3*). It shows that males who found to be feminine were more likely to be found as homosexual; whereas women who were found to be masculine were much less likely to be found as homosexual. The reason for this is strictly because of the views of society today. Males are seen as dominant figures whereas women are not; thus, when a male is homosexual he loses that dominance factor, whereas with women that is not the case. Thus, society looks at male homosexuality much more harshly. Overall, society looks down on homosexuality, which can be seen from the results in *Figure 4*.

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Appendix

Audio Script

My name's Alex and I'm a junior in college studying communications. I'm from a small town in Kentucky and have a small family. I have two siblings, an older sister and a younger brother. In high school I played basketball and ran track and currently I like to stay active by playing intramural sports. Recently, I had the opportunity to visit a friend who was studying abroad in England. I really enjoyed traveling and seeing another country. It was my first time abroad and I was really excited about going somewhere new and trying new things.

I'm a pretty easy going person; laid back and level headed. I like to be social and like have a good time with my friends. Some of the best nights I've had have been just hanging out, having a few drinks and some laughs with my friends. Lately, however, I've been trying to concentrate more on my studies so I can get into graduate school.

Demographics

Age:

Gender:

Race:

Occupation/Student:

Survey

*Please circle the most appropriate answer. 1=Definitely **DISAGREE** and 5=Definitely **AGREE***

1.) Alex is a JUNIOR in college.

1 2 3 4 5 6

2.) Alex has THREE siblings.

1 2 3 4 5 6

3.) Alex has many female friends.

1 2 3 4 5 6

4.) Alex would like to take ballet lessons.

1 2 3 4 5 6

5.) Alex would be interested in playing rugby.

1 2 3 4 5 6

6.) Alex would NOT enjoy a game of pick-up football.

1 2 3 4 5 6

7.) Cooking is something Alex would enjoy.

1 2 3 4 5 6

8.) Alex would enjoy childcare.

1 2 3 4 5 6

9.) A fishing trip would interest Alex.

1 2 3 4 5 6

10.) Alex would enjoy a day of shopping.

1 2 3 4 5 6

11.) Alex would be interested in a backpacking trip through Europe.

1 2 3 4 5 6

12.) Alex would NOT be interested in a hunting trip.

1 2 3 4 5 6

13.) A strip club would interest Alex.

1 2 3 4 5 6

14.) Alex would enjoy reading *Cosmopolitan Magazine*.

1 2 3 4 5 6

15.) Alex enjoys being fashionable.

1 2 3 4 5 6

16.) Alex is masculine.

1 2 3 4 5 6

17.) I would be interested in getting to know Alex.

1 2 3 4 5 6

18.) I would feel comfortable spending time with Alex (in a friendly manner).

1 2 3 4 5 6

19.) Alex would be interested in refurbishing an old car.

1 2 3 4 5 6

20.) Alex is a passive individual.

1 2 3 4 5 6

21.) Alex is a submissive person

1 2 3 4 5 6

22.) Alex would be over dramatic about an event-gone-wrong.

1 2 3 4 5 6

23.) Alex does not have any homosexual friends.

1 2 3 4 5 6

24.) Alex is more feminine than masculine.

1 2 3 4 5 6

25.) I would prefer not to spend time with Alex.

1 2 3 4 5 6

26.) Alex is a homosexual

1 2 3 4 5 6