INVESTIGATING LESBIAN, GAY, AND BISEXUAL (LGB) VISIBILITY AND CLIMATE IN THE NATURAL SCIENCES

A Thesis submitted to the faculty of
San Francisco State University
In partial fulfillment of
the requirements for
the Degree

Master of Science

In

Geoscience

by

Derik Paul Gonzales

San Francisco, California

August 2017

CERTIFICATION OF APPROVAL

I certify that I have read *Investigating Lesbian, Gay, and Bisexual (LGB) Visibility and Climate in the Natural Sciences* by Derik Paul Gonzales, and that in my opinion this work meets the criteria for approving a thesis submitted in partial fulfillment of the requirement for the degree Master of Science in Geoscience at San Francisco State University.

Leonard Sklar, Ph.D.
Professor of Geology

Kimberly D. Tanner, Ph.D.
Professor of Biology

Adrienne Cool Ph.D.
Professor of Astronomy

INVESTIGATING LESBIAN, GAY, AND BISEXUAL (LGB) VISIBILITY AND CLIMATE IN THE NATURAL SCIENCES

Derik Paul Gonzales
San Francisco, California
2017

Increasing the diversity of students in science is a major topic of discussion in science education literature. Much of the focus is on scientists with visible diversities, such as gender or ethnicity. There is little research on individuals with invisible diversities, such as identifying as lesbian, gay or bisexual (LGB). LGB individuals continue to remain unstudied in the sciences. Several studies have measured the campus climate for LGB students and faculty, but few have looked at student and faculty's awareness of the presence of LGB faculty in their science departments. To address this, I investigated the LGB visibility and climate for LGB students in the natural sciences. Specifically, I will share insights about LGB visibility that was obtained through an online, anonymous survey with students and faculty in four natural science departments: Biology, Chemistry, Earth Science, and Physics. Furthermore, based on this initial exploration of LGB visibility in the natural sciences, I have recommendations for administrators, faculty and future studies. This survey study has the potential for LGB faculty and administrators to address the issue of LGB visibility and climate in their science departments.

I certify that the Abstract is a correct representation of the content of this thesis.

Chair, Thesis Committee

10-25-2017

Date

PREFACE AND/OR ACKNOWLEDGEMENTS

I would like to thank my parents, Shirley Gonzales and Alvin "Salu" Gonzales, Sr. for always being there for me and inspiring me to stay in school. As a first-generation college student, it was extremely important that I succeed in my academics, since my family members were deprived of a decent education and upbringing. Although, my parents did not understand what it felt like to receive an education, they understood the importance of having one in today's world, and so they encouraged me to successful in school. When my father died in 2014 at the age of 71, he could not read and write. Which made it such a huge accomplishment for me to be the first person in our family to graduate from college. I would also like to thank my partner, Daniel Rodriguez for helping me with formatting all my documents throughout my graduate career. He has always been very supportive of me. I would also like to thank my mentor, Dr. Kimberly D. Tanner, for taking me into her lab, being super supportive, and inspiring me to do such innovative research. She is the best and I could not have asked for a better mentor. I would also like to thank my thesis committee members, Dr. Leonard Sklar and Dr. Adrienne Cool, for being supportive in my research. Lastly, I would like to thank all the past and present SEPAL lab mates, the SEPAL Resource Center, Patricia DeVera, the SFSU Office of Student Affairs, The College of Science and Engineering Administration, and the Department of the Earth & Climate Sciences.

TABLE OF CONTENTS

List of Tables viii

List of Figures ix

List of Appendices x

1. Introduction 1

1.1 Lack of Diversity in the Sciences 1

1.2 Importance of Role Models in Science 1

1.3 Invisible Diversity in the Sciences 2

1.4 Research Questions 3

2. Methods 5

2.1 Target Study Respondents 5

2.1.1 Sampling Procedures 5

2.1.2 Exclusion Criteria 6

2.2 Survey of LGB Issues in the Sciences 6

2.2.1 Survey Development and Refinement 7

2.2.2 Survey Questions on LGB Awareness in Science Departments 7

2.2.3 Survey Questions on LGB Student and LGB Faculty Perspectives on their Level of Openness regarding their Sexual Orientation 8

2.2.4 Survey Questions on Climate for LGB Students in Science Departments 8

2.2.5 Survey Demographic Questions 9

2.2.6 Institutional Review Board 9

2.2.7 Survey Implementation 10

2.3 Data Analyses & Statistics 10

3. Results 12

3.1 Survey of Respondents 12

3.1.1 Student Respondents 12

3.1.2 Faculty Respondents 13

3.2 Awareness of the Presence of LGB Students by Students and Faculty in their Science Departments 14

3.3 Awareness of the Presence of LGB Faculty by Students and Faculty in their Science Departments 14

3.3.1 Awareness of the Presence of LGB Faculty by LGB Student Versus Non-LGB Student in their Science Departments 15

3.4 Level of Openness about Sexual Orientation by LGB Students and LGB Faculty in Science Departments 16

3.4.1 Comfort Level in Talking about Sexual Orientation 16

3.4.2 Importance Level of Letting Others Know about their Sexual Orientation 17

3.5 Climate for LGB Students in Science Departments 17

3.5.1 Student and Faculty Perceptions of the General Climate for LGB Students in their Science Departments 18

3.5.2 LGB versus Non-LGB Student Perceptions of the General Climate for LGB Students in their Science Departments 19

3.5.3 Perceptions of the Influence of Being Openly LGB on Student Academic Experience in Science Departments 19

3.5.4 Frequency of Reports of Disparaging Remarks about LGB People in Science Departments 20

4. Discussion 21

4.1 Students and Faculty Perceive the Climate for LGB Students in the Sciences as Accepting....21

4.2 LGB Faculty are Comfortable Talking about their Sexual Orientation with Students....22

4.3 Natural Science Students are Unaware of LGB Faculty in their Departments....24

4.4 Implications of the Key Findings....25

4.5 Study Limitations....26

4.6 Conclusion....27

References....50

Appendices....53

LIST OF TABLES

Table Page

1. Student Respondent Demographics....32
2. LGB Student Respondent Demographics....33
3. Faculty Respondent Demographics....34
4. LGB Student Respondent Demographics....35
5. Faculty Quotes Describing the Climate for LGB Students in their Science Department....36
6. Biology Student Quotes Describing the Climate for LGB Students in their Science Department....37
7. Chemistry Student Quotes Describing the Climate for LGB Students in their Science Department....38
8. Earth Science Student Quotes Describing the Climate for LGB Students in their Science Department....39
9. Physics Student Quotes Describing the Climate for LGB Students in their Science Department....40

LIST OF FIGURES

Figures Page

1. Student and Faculty Awareness of LGB Students in their Science Department....41
2. Student and Faculty Awareness of LGB Faculty in their Science Department....42
3. LGB Student and Non-LGB Student Awareness of LGB Faculty in their Science Department....43
4. LGB Faculty and LGB Students Comfort Level in Talking about their Sexual Orientation....44
5. LGB Faculty and LGB Students on Importance of Letting Others Know about their Sexual Orientation....45
6. Student and Faculty Perceptions of Climate for LGB Students in their Science Department....46
7. LGB and Non-LGB Respondent Perceptions of the Climate for LGB Students in their Science Department....47
8. Student and Faculty Perceptions of the Influence of Being Openly LGB on a Student's Academic Experience in their Department....48
9. Student and Faculty Reports on Frequency of Disparaging Remarks about LGB People....49

LIST OF APPENDICES

Appendix Page

1. Investigating LGB Visibility and Climate in the Natural Sciences Student Survey.....53
2. Investigating LGB Visibility and Climate in the Natural Sciences Faculty Survey.....65

1. INTRODUCTION

1.1 Lack of Diversity in the Sciences

It is well documented that in the United States (U.S) over 50% of college students are not completing their degrees in science, technology, engineering, and mathematics (STEM) majors (NAS, 2011). Furthermore, a report released by the President's Council of Advisors on Science and Technology predicted a deficit of over one million college graduates in STEM by 2022 (PCAST, 2012). University administrators and educators must recruit, retain, and train the next generation of scientists, engineers, technologists, and mathematicians successfully and rapidly to ensure that the U.S. workforce doesn't experience a decrease in qualified STEM professionals over the next 10 years. However, historically and currently, the U.S. workforce has relied heavily on cis-gendered, straight, white, male and international college graduates to fulfill jobs in STEM (NAS, 2011). This limits the people that can study and fulfill jobs in science, which in turn limits the potential research projects. Increasing the diversity of scientists will ultimately increase the talent pool, enhance innovative research, and improve the nation's economy. The diversity of students and faculty vary differently among the STEM disciplines. Currently, much of the focus in increasing diversity within STEM relates to visible diversity, such as gender or ethnicity. More research is needed to understand how the lack of diversity in the natural sciences can affect students who bring less visible forms of diversity to science, such as identifying as lesbian, gay, or bisexual (LGB).

1.2 Importance of Role Models in the Sciences

To increase diversity in the sciences, students need to have access to role models and mentors in which they can see themselves. Natural science students find mentors by a variety of methods that vary across disciplines, at different universities, and between graduate and undergraduate levels. Graduate students in the natural sciences often find

advisors, who are usually tenured or tenure-track faculty, with whom they share similar research interests, while undergraduate students are often assigned an advisor by their department or university. Studies have shown that the majority of college students reported having an advisor and very few report having a mentor or role model (Atkinson et al., 1994; Clarke et al., 2000; Cronan-Hillix et al., 1986; Holingsworth and Fassinger, 2002; Johnson et al., 2000; Schlosser and Gelso, 2001; Sedlacek et al., 2007). One reason maybe that the mentor relationship isn't as formally defined as an advisor. A mentor or role model can be someone in the same field of study as the student who guides them in their academic careers, and/or someone that the student can relate to, look up to, and learn from. When a student does find a suitable mentor, it is often voluntary and unplanned. Mentors can often be an advisor that has crossed over into the mentor role. Students tend to gravitate toward mentors they share research interests with, but can also relate to other characteristics, such as belonging to the same ethnicity or gender. For example, when women students in the natural sciences were aware of the presence of women mentors, it was thought to boost their self-efficacy. The struggle to find suitable role models and mentors, who share common research interests and understand what it feels like to exist in a heteronormative society, may make it harder to retain LGB students in science. Heteronormative is a world view that heterosexuality is the only normal, natural, and/or preferred sexual orientation (Merriam-Webster, 2015). It is not as easy for lesbian, gay and bisexual students to find suitable mentors, given LGB faculty must first come out. Do LGB faculty in the natural sciences exist and are students aware of their presence?

1.3 Invisible Diversity in the Sciences: LGB Scientists

Visibility is defined as the state of being able to see or be seen (Merriam-Webster Dictionary, 2015). Invisible diversities are differences in people that are not necessarily apparent or visible to the naked eye, such as being a first generation college student,

socio-economic status, and sexual orientation. There is very little to no literature on individuals with invisible diversities in natural science (Cooper and Brownell, 2016). Invisible diversities are not as apparent as the visible differences that exist among us. Nevertheless, they are just as important to a person's identity. While hundreds of studies have investigated how women and people of color are affected in science fields that are dominated by white men, little is known about how LGB individuals are affected in these heterosexual male dominant fields.

With current data sets, exact numbers of LGB students and faculty cannot be accurately determined. However, a national survey from the American College Health Association suggests that 7.2 percent of college students identify as lesbian, gay, or bisexual (ACHA, 2010; Herbenick et al, 2010; Marine, 2011). In this present study, which was conducted at a major, urban, public university in the San Francisco Bay Area, the students and faculty are expected to identify as LGB at much higher rates than in previous studies. Since demographic data on LGB individuals are not usually collected by universities, it becomes the individual's choice to have their sexual orientation identity become visible to others. What if students are not aware of LGB faculty in their science departments? Do LGB faculty in science exist, but are not comfortable coming out to their students? If LGB faculty do not come out to students then that part of their identity will remain invisible to them, which is a potential loss for suitable role models and mentors within the LGB community. While LGB faculty are physically seen by their students and their colleagues, if they are not open about their sexual orientation, then their LGB identity while remain "invisible" to them.

1.4 Research Questions

Existing research measures the experiences of LGB students and faculty across university campuses, which may not address the issues that are faced by LGB scientists specifically (CEC, 2010; Brown and Gortmaker, 2009; Rodriguez, 2014; CU-Boulder,

2010; Evans and Herriott, 2004). Additionally, current studies have not considered the awareness of LGB faculty by their students and colleagues to address LGB visibility. The main goal of this study is to understand LGB visibility in the natural sciences, by determining if LGB faculty are present in natural science departments and to what extent students are aware of their presence. To address this issue, this research project aimed to 1) develop a survey to measure the visibility of LGB faculty in the natural sciences 2) interpret data generated by survey data to understand students' awareness of LGB faculty at their institution. Below I will list the specific research questions that my study has aimed to address.

1. To what extent are students and faculty aware of the presence of LGB faculty and students in their science departments?

2. How similar or different is awareness of LGB faculty between LGB students and non-LGB students?

3. How similar or different is LGB students' and LGB faculty's level of openness about their sexual orientation in the natural sciences?

4. How do students and faculty perceive the climate for LGB students in their science departments?

2. METHODS

This section describes the research methods used to gain insights into my research questions about lesbian, gay, and bisexual (LGB) issues in the sciences. This study focused on issues related to LGB student and LGB faculty awareness, climate for LGB students, and perspectives of LGB students and LGB faculty on their level of openness regarding their sexual orientation. The methods implemented in this study will be explained in the following three major sections: the target study respondents, survey of LGB issues in the sciences, and the approaches to data analyses and statistical comparisons.

2.1 Target Study Respondents

To gain insight into the perspectives of both LGB science students and faculty, as well as, non-LGB science students and faculty, all populations were recruited to participate. Students and faculty were recruited from a major, urban, minority-serving, public institution in San Francisco, California. This research focused on LGB issues because these individuals represent a form of invisible diversity in the sciences that has been largely unstudied. A study on the perspectives of transgender individuals or on transgender issues in the sciences would be important in future work; however, this study focused on sexual orientation and not gender identity.

2.1.1 Sampling Procedure

Sampling strategies implemented for students were necessarily different than faculty. To determine a sample of students across four natural science departments– Biology, Chemistry, Earth Science, and Physics, I collaborated with the university's Office of Student Affairs. To prevent survey fatigue occurring more broadly on campus, a randomized sample was constructed of 50% of students currently enrolled in the natural sciences. Both graduate and undergraduate students were invited to participate in this

study. To understand faculty perspectives at the same institution, the entire population of science faculty were recruited to participate, including all tenured and tenure-track faculty from the four natural science departments. The faculty invitations were emailed directly via email by the researcher.

2.1.2 Exclusion Criteria

For this study, respondents were excluded from data analyses based on the following four exclusion criteria. First, any respondents that answered "No" to the consent to participate question; Second, if respondents skipped five or more survey questions; Third, any respondents that did not answer the sexual orientation question, which was critically important to disaggregating data between LGB and non-LGB individual; Lastly, any respondents that were not affiliated with Biology, Chemistry, Earth Science, or Physics Departments.

2.2 Survey of LGB Issues in the Sciences

To address my research questions for this study, I chose a survey methodology to be able to collect information from large numbers of individuals. The survey was designed to probe the three major focuses of the study: LGB student and LGB faculty awareness, climate for LGB students, and perspectives of LGB students and LGB faculty on their level of openness regarding their sexual orientation. Below, I describe the following: survey development and refinement, the survey questions themselves, Institutional Review Board approval, and survey implementation.

2.2.1 Survey Development and Refinement

For this initial study, the goal was to design a survey using published survey questions that related to the study's focus, that would be appropriate for both students and faculty. The survey was designed in two formats using Survey Monkey, one for students and one for faculty. Each survey was designed to be completed online, ~ 5 minutes in length, and was anonymous. The surveys were designed to be nearly identical to allow for statistical comparisons. Surveys contained both closed-ended and open-ended questions. The surveys were face-validated by science students and faculty before implementation in Fall 2016.

2.2.2 Survey Questions on LGB Awareness in Science Departments

On issues of LGB student and faculty awareness, survey questions were adapted from the University of Colorado at Boulder Campus Climate Survey (2010; see Box 1). To determine if students and faculty were aware of LGB students in their department, respondents were asked to reply to survey question 1 shown in Box 1. Respondents were asked to respond to survey question 2 (Box 1) to probe their awareness of LGB faculty in their department. The multiple-choice responses were kept the same for both survey questions to be able to compare the findings. A range of six responses were created to represent the number of LGB individuals that the respondent was aware of within their department. The responses that ranged in awareness of LGB individuals were labeled with values: 1-2, 3-5, 5-10, or >10. The response labeled "0" was created for respondents that were not aware of any LGB individuals in their department. The response "don't know" was created for people that were not sure.

2.2.3 Survey Questions on LGB Student and LGB Faculty Perspectives on their Level of Openness regarding their Sexual Orientation

To better understand the perspectives of LGB individuals on their level of openness with students and faculty regarding their sexual orientation, two LGB-specific prompts were adapted from Visibility and Coping with Minority Stress: A Gender Specific Analysis among Lesbians, Gay Men, and Bisexuals in Flanders by Dewaele (2014). Both prompts had five subcategories that varied between student (Box 2A) and faculty (Box 2B) surveys. The first prompt asked LGB respondents how comfortable they felt talking about their sexual orientation with students and faculty in various settings. The choices for the responses were strongly agree, agree, disagree, and strongly disagree. LGB respondents were asked to respond to the second prompt about the level of importance in letting students and faculty know about their sexual orientation in various settings. The choice responses were kept the same for both prompts. These prompts were designed to reflect active and inhibitive behaviors. Inhibitive behaviors are associated with the feelings of one's disclosure about their sexual orientation, while active behaviors are behaviors used to make one's sexual orientation more apparent (Dewaele et. al, 2014).

2.2.4 Survey Questions on Climate for LGB Students in Science Departments

On issues regarding climate for LGB students, survey questions were adapted from the University of North Florida's Campus Climate for Lesbian, Gay, Bisexual, and Transgender/Transsexual Students, Faculty, and Staff Survey (2006). To determine what the general climate is like for LGB students in the sciences, respondents were asked to reply to a series of three survey questions (Box 3). The three climate questions were asked using multiple-choice responses in addition to two open-ended, written responses. For the first climate question, the goal was to understand the perceptions of the respondent regarding the climate for LGB students in their department. The respondents' choices were very accepting, somewhat

accepting, somewhat unaccepting, very unaccepting, or don't know. They were then asked to follow-up with a one to two sentence explanation for selecting their choice. For the second climate question, we were looking for the general attitudes toward LGB students in respondents' departments by asking them about the influence on a student's academic experience by being openly LGB. The choices for the responses were yes, no, or don't know. Lastly, respondents were asked the frequency of disparaging remarks toward LGB individuals by students, faculty, and staff in their departments. The options were never, seldom, sometimes, often, and constantly. They were asked to follow-up with a one to two sentence explanation if they had ever heard any disparaging remarks about LGB people.

2.2.5 Survey Demographic Questions

To be able to describe the data, implement the exclusion criteria, and disaggregate between LGB and non-LGB individuals, a series of general demographics were asked at the close of the survey. Respondents were asked general questions related to their relationship to the university, such as what major department they belong to, their student/professional status, and how many semesters they have been a student/teaching at SFSU. Respondents were then asked a series of more personal, self-identifying questions, such as age range, ethnicity/race, gender identity, and sexual orientation (see Appendix 1 and 2). Any of the respondents that identified as LGB in the sexual orientation question were automatically redirected to the two additional LGB-specific questions about their level of openness with students and faculty about their sexual orientation.

2.2.6 Institutional Review Board

Approval from the university's Institutional Review Board for Human Subjects was obtained. The application for exemption was submitted in the early spring semester of

2016. In May 2016, the Institutional Review Board had determined project (#E16-150) "exempt" from regulatory oversight and further reviews. The project was found exempt under the following code: 45 CFR 46.101 (b)(2) 45 CF 46.101 (b)(2) *because it is research involving the use of anonymous survey procedures.*

2.2.7 Survey Implementation

Data collection began in Fall 2016 and surveys were open for approximately six weeks. Students were given an initial invitation to participate and two follow-up reminders. Faculty were given an initial invitation and four follow-up reminders. To increase student participation, a drawing was held for student respondents that completed the survey. There were 30 prizes that respondents could potentially win, such as an iPad mini and 29 Amazon gift cards of various amounts. Given the much smaller number of faculty, faculty respondents were offered a chance to request a $10 Amazon gift card for completing the survey.

2.3 Data Analyses and Statistics

For data analyses, individuals' responses were downloaded into an Excel spreadsheet directly from Survey Monkey's online platform. The Excel Spreadsheet was formatted to allow for easier analyses and to begin quantifying responses for descriptive statistics.

Excel was used to quantify the different choices that respondents chose from the survey questions. In some cases, the choices were collapsed for more detailed analyses. For example, the responses to the LGB student and LGB faculty awareness questions (Box 1) were collapsed from six to three responses: yes, no, and don't know. Yes, being if they were aware of at least one or more LGB student or LGB faculty. No, being if they responded with 0, and don't know was kept the same. The choices for survey question 3

were also collapsed (Box 3) to accepting, unaccepting, and don't know. Very and somewhat accepting responses were combined and labeled as accepting, and the same was done for very and somewhat unaccepting. Don't know was kept the same, as in the previous example. Chi square tests were used to make statistical comparisons between faculty and student respondents, as well as LGB and non-LGB respondents. Chi square tests were made using JMP 13. For chi square analyses, a threshold of greater than 95% confidence level was used to determine significance among these comparisons. For example, the probability value had to be $< .05$ to be determined statistically significant. A threshold of 95% confidence level was chosen to reduce the chances of a false positive.

The open-ended questions were part of a comment box added to the description of climate for LGB students survey question. While responses were not elaborate enough to warrant extensive qualitative coding and theme analysis, in the results section I will share representative student and faculty quotes across each department, as well as quotes from LGB and non-LGB respondents.

3. RESULTS

To address my research questions, two online surveys were developed and administered to a sample of students and the entirety of the faculty in the four natural sciences departments. Below are the results from the surveys, which include the characteristics of the survey respondents, their awareness of LGB students and LGB faculty, their opinions on the climate for LGB students, and the perspectives of LGB students and LGB faculty on their openness about their sexual orientation.

3.1 Survey of Respondents

Both LGB and non-LGB science students and faculty were invited to participate in the survey to gain insights into LGB issues in the sciences. Below is an overview of all survey respondents in two sections: student respondents and faculty respondents

3.1.1 Student Respondents

An overview of participants and departmental response rates are shown in Table 1. A randomized population of science students (n=745) were invited to participate in this study, which included both undergraduate and graduate students. Of the 745 students invited, 250 students responded to the email invites. Based on the exclusion criteria, 32 student respondents were excluded from data analyses. Of the 32 students excluded, 21 students answered zero survey questions, 8 students answered less than five survey questions, 2 students answered "no" to the consent to participate question, and 1 student was a mathematics major. Thus, the final n-value for all students was n=218, which yielded a 29% overall response rate. Response rates ranged from 21% to 35% across the four natural science departments. The majority of student respondents were undergraduate (81%, n=176/218), female (61%, n=133/218), and people of color (76%,

n=166/218). For this study, people of color was defined as respondents that self-identified with an ethnicity or race other than White, which included, Hispanic or Latino, Asian, African-American or Black, Native American, Pacific Islander, and Multi-racial individuals.

The percentage of student respondents that self-identified as LGB (16%, n=35/218) was higher than expected. LGB student respondent demographics are reported separately in Table 2. LGB student respondents were majority undergraduate students (83%, n=29/35), female (60%, n=21/35), and people of color (66%, n=23/35). The LGB student respondents in this study are doubly underrepresented in the sciences. First, by their visible diversity, such as gender, ethnicity, or race, and second, by their invisible diversity, i.e. their sexual orientation.

3.1.2 Faculty Respondents

Faculty response rates ranged from 41% to 82% across all four natural science departments (see Table 3). From the four natural science departments, 90 tenured or tenure-track faculty were invited to participate in the survey. Of the 90 faculty members invited, 49 faculty responded to the email invites. Out of the 49 faculty that responded, 2 faculty respondents were excluded from data analyses, one of whom answered "no" to the consent to participate question and another who did not answer the required question on sexual orientation needed for disaggregation of the data. Thus, the final n-value for all faculty was n=47, which yielded a 52% overall response rate. Faculty respondent general demographics are shown in Table 3. Unlike student respondents, majority of faculty respondents self-identified as White (68%, n=32/47) and male (57%, n=27/47). 17% of faculty respondents identified as LGB (n=8/47). LGB faculty respondents' general demographics are reported separately in Table 4. Majority of LGB faculty respondents

also self-identified as male (75%, n=6/8), however 50% identified as people of color (n=4/8).

3.2 Awareness of the Presence of LGB Students by Students and Faculty in their Science Departments

Both student and faculty respondents answered survey question 1 to determine to what extent they are aware of LGB students within their science departments (see Box 1). The results from all students and faculty are shown in Figure 1, with an overview of all natural science departments aggregated in Figure 1A. Figures 1B through 1E show results disaggregated by individual department. In Figure 1A, there was a higher proportion of faculty (89%, n=42/47) than students (81%, n=176/218) who asserted awareness of LGB students. Statistical comparisons between the aggregated student and faculty responses (Figure 1A) using chi square analysis did not reveal a significant difference ($p= 0.2137$; $\chi^2 = 3.087$). Higher percentages of faculty than students reporting awareness of LGB students in their departments can be seen in all disaggregated subfigures, 1B-1E. Some student respondents across the four natural science departments, except for Earth Science (Figure 1D), reported that they were not aware (n=11/218) of any LGB students in their department. Additionally, in every department except for Earth Science, there were student respondents who self-identified as LGB (see Table 1). It is important to note that these results do not mean that there are not LGB students in Earth Science, but rather that the Earth Science students that participated did not self-identify as LGB.

3.3 Awareness of the Presence of LGB Faculty by Students and Faculty in their Science Departments

To determine the extent to which students and faculty are aware of LGB faculty within their science departments, respondents were asked to respond to survey question 2 (see Box 1). The results from all students and faculty are shown in Figure 2, with an

overview of all natural science departments aggregated in Figure 2A. Figures 2B through 2E show results disaggregated by individual department. In Figure 2A, there was a significantly higher proportion of faculty (89%, n=38/47) than students (44%, n=96/218) who asserted awareness of LGB faculty. Statistical comparisons of the aggregated student and faculty responses (Figure 2A) using chi square analysis revealed a significant difference ($p = <.0001$; $\chi^2 = 20.974$). There was also a significant difference among disaggregated student and faculty responses (Figure 2B) in the biology department ($p = <.0001$; $\chi^2 = 24.574$). The number of respondents were too low to complete statistical comparisons for the remaining three departments (Figure 2C-2E). What stood out the most among the data was that the Chemistry student respondents reported that they were aware of at least one LGB faculty in their department (47%, n=18/38). However, 56% (n=5/9) of chemistry faculty respondents reported that they were not aware of any LGB faculty in their department, while the other 44% reported that they did not know. It was important to note that in all departments, except Chemistry, faculty respondents were in complete agreement that they were aware of at least one LGB faculty colleague in their department. The LGB faculty respondent data across departments supports these faculty perceptions (see Table 3).

3.3.1 Awareness of the Presence of LGB Faculty by LGB Student vs. Non-LGB Student in their Science Departments

To determine if LGB students were more aware of the presence of LGB Faculty than their non-LGB counterparts, the data were disaggregated by sexual orientation. The results from all LGB and non-LGB students are shown in Figure 3. There was a higher proportion of LGB students (54%, n=19/35) than non-LGB students (43%, n=75/173) who asserted awareness of LGB faculty in their department. Nearly half of LGB student respondents (46%, n=16/35) reported that they were not aware of LGB faculty in their science departments, even though two or more faculty respondents self-reported as LGB across three of the four natural science departments (see Table 3). Chi square analysis did

not reveal a significant difference ($p=0.0823$; $\chi^2 = 4.995$) between LGB and non-LGB student responses (Figure 3).

3.4 Level of Openness about Sexual Orientation by LGB Students and LGB Faculty in Science Departments

This section will report the data about respondents' levels of openness in regard to their sexual orientation. This was probed for two populations, LGB students and LGB faculty. Respondents were asked to share two aspects of openness. First, how comfortable they were talking about their sexual orientation with others. Secondly, the importance that they put on letting others know about their sexual orientation. For these prompts, statistical comparisons were not attempted between student and faculty responses for two reasons: low numbers of LGB respondents and response subcategories that were not easily comparable.

3.4.1 Comfort Level in Talking about Sexual Orientation

To determine the comfort level of respondents with regards to their sexual orientation, LGB respondents were first asked to answer a prompt (see Box 2A) created to elicit feelings of inhibitive behaviors. The results from all LGB students and LGB faculty are shown in Figure 4, with LGB faculty responses in Figure 4A and LGB student responses in figure 4B. The majority of LGB faculty respondents (88%, n=7/8) were more comfortable talking about their sexual orientations with faculty colleagues than with students. Similarly, LGB student respondents (77%, n=27/35; 69% n=24/35) were more comfortable talking about their orientations with other students than with faculty. LGB faculty respondents (75%, n=6/8) were comfortable talking about their sexual orientations with students who they advise and students who work in their labs. LGB student respondents (57%, n=20/35) were comfortable with faculty advisors. Only a

subset of LGB faculty respondents (63%, n=5/8) were comfortable talking about their sexual orientation with students in their courses, and the lowest proportion of LGB student respondents (40%, n=14/35) were comfortable with faculty who teach them in courses.

3.4.2 Importance Level of Letting Others Know about their Sexual Orientation

To further understand how LGB respondents perceive their sexual orientation, respondents were probed with a second prompt (see Box 2B), which was created to elicit feelings of active behaviors. The results from all LGB students and LGB faculty are shown in Figure 5, with LGB faculty responses in Figure 5A and LGB student responses in Figure 5B. For all subcategories, more than 60% of LGB faculty respondents agreed that it was important to let both students and faculty know about their sexual orientation. In contrast, only 14% of LGB student respondents agreed with all subcategories. As in the previous prompt, the majority of LGB faculty respondents (88%, n=7/8) reported that it is important to let other faculty colleagues know about their sexual orientations as well as students. LGB student respondents (31%, n=11/35) agreed most with it being important to let other students at work know about their sexual orientation. Fewer LGB faculty respondents (63%, n=5/8) thought it was important to let students whom they advise know about their sexual orientation than any of the other subcategory groups. The least agreement among LGB student respondents was about importance of sharing their sexual orientation with faculty who teach them in a course (14%, n=5/35).

3.5 Climate for LGB Students in Science Departments

To determine what the climate is like for LGB students in the natural sciences at this institution, all students and faculty were asked their perceptions of climate in a series of

three questions. The following four sections below will describe the results of the three survey questions regarding climate for LGB students (see Box 3).

3.5.1 Student and Faculty Perceptions of the General Climate for LGB Students in their Science Departments

Overall, the quantitative data for student and faculty respondents show that they perceived the climate for LGB students in their science department as accepting. To get a general idea of the climate for LGB students in the sciences, respondents were asked to answer survey question 5 (see Box 3) and to explain their answer in one to two sentences. The quantitative results from all students and faculty are found in Figure 6, with all natural science departments aggregated in Figure 6A. In the remaining subfigures, 6B-6E results are disaggregated by individual department. Statistical comparisons of student and faculty respondents (Figure 6A) using chi square analysis revealed no differences ($p= 0.4952$; $\chi^2 = 1.405$).

The qualitative data tells a slightly different story. The qualitative data for faculty can be found in Table 5 and is disaggregated by sexual orientation. The majority of the quotes represented in Table 5 by all faculty respondents, revealed that they did not witness any discrimination toward LGB students in their department. Generally, they viewed their departments as safe spaces for LGB students to learn and thrive.

Students' qualitative data were compiled into four tables by department (Tables 6-9). The quotes in each of these tables were also disaggregated by sexual orientation. LGB student respondents, from all departments, generally thought that there is a major lack of representation in their department and an unacknowledged acceptance of LGB people. One student went as far as to say that, "I haven't seen any discrimination, nor have I seen acceptance. I believe it would be an accepting climate if brought up." Non-LGB student respondents, were more positive in their quotes. Generally, they felt that their departments are collaborative and open to all individuals.

3.5.2 LGB versus Non-LGB Student Perceptions of the General Climate for LGB Students in their Science Departments

To determine if LGB respondents perceived the climate the same or different as non-LGB respondents, the quantitative data were disaggregated by sexual orientation for survey question 5 (see Box 3). The results from LGB and non-LGB respondents are shown in Figure 7, with student responses in Figure 7A and faculty responses in Figure 7B. Statistical comparisons of LGB and non-LGB student respondents using chi square analysis revealed no difference ($p= 0.3897$; $\chi^2 = 1.885$). Chi square analysis was also made for statistical comparisons between LGB and non-LGB faculty respondents, which revealed no difference ($p= 0.8705$; $\chi^2 = 0.027$). In general, LGB respondents perceived the climate for LGB students as accepting in their science departments.

3.5.3 Perceptions of the Influence of Being Openly LGB on Student Academic Experience in Science Departments

To further probe respondents' perceptions of climate, respondents were asked to complete survey question 6 about attitudes toward LGB individuals (see Box 3). The results from student and faculty respondents are shown in Figure 8, with all student and faculty in Figure 8A. In the remaining subfigures, 8B and 8C, results are disaggregated by sexual orientation. In figure 8B, the results for LGB faculty vs. non-LGB faculty are shown. The results for LGB and non-LGB students are shown in figure 8C. Statistical comparisons of student and faculty respondents (Figure 8A) revealed no difference ($p= 0.3823$; $\chi^2 = 1.923$). Statistical comparisons between LGB and non-LGB student respondents ($p= 0.1476$; $\chi^2 = 3.826$) as well as between LGB and non-LGB faculty ($p=0.1838$; $\chi^2 = 3.388$) also revealed no difference.

3.5.4 Frequency of Reports of Disparaging Remarks about LGB People in Science Departments

The last survey question (see Box 3) probing respondents on their perceptions of climate asked respondents about their experiences within their science departments. These results are shown in Figure 9, with disparaging remarks by students shown in Figure 9A, disparaging remarks by faculty shown in Figure 9B, and disparaging remarks by staff shown in Figure 9C. In general, a majority of faculty respondents reported that they never heard disparaging remarks about LGB people by students (98%, n=46/47), faculty (100%, n=47/47), or staff (98%, 43/44) in their departments during the current semester. Student respondents reported having heard disparaging remarks about LGB more often by other students (19%, n=42/218) than faculty (6%, n=13/218) and staff (7%, n=16/218). Chi square analysis was made for statistical comparisons between students and faculty respondents for all three categories: frequency of disparaging remarks by students ($p= 0.0384$; $\chi^2 = 8.403$), by faculty ($p= 0.2291$; $\chi^2 = 2.947$), and by staff ($p= 0.4046$; $\chi^2 = 2.917$). There was a statistically significant difference between student and faculty respondents in regard to disparaging remarks by students. However, because the responses being compared had 20% or more cells that contain zeros, the chi square analysis were not reliable.

4. DISCUSSION

This study provides insights into the visibility of lesbian, gay, and bisexual (LGB) students and faculty, their openness with others about their sexual orientation, and the climate for LGB students in the natural sciences at a major, urban, minority-serving institution in the San Francisco Bay Area. While research related to LGB issues has increased in recent years, LGB individuals continue to largely remain underrepresented in science education research (Cooper and Brownell, 2016). Relative to investigations on the experiences of women and ethnic minorities, there is little research regarding the lack of diversity in science for individuals with invisible diversity, groups who are less visible or aspects such as sexual orientation, gender identity, and differential abilities to name a few. The following sections describe the three key findings, their implications, and recommendations for potential changes.

4.1 Students and Faculty Perceive the Climate for LGB Students in the Sciences as Accepting

The climate for LGB individuals is no doubt a key for success in academic settings. In this study, student and faculty respondents reported that the climate for LGB students in their science department was accepting. LGB faculty, as well as non-LGB faculty, viewed their department as accepting and generally open to all individuals. This was reported both in the context of closed-ended and open-ended questions. However, student respondents had a richer variety of experiences than faculty, as reflected in their shared stories and statements. In the open-ended question, the majority of student respondents reported never experiencing discrimination toward LGB individuals; however, they also reported an absence of outward shows of acceptance, few role models, and silence on sexual orientation in general interactions. When student responses were disaggregated between LGB respondents and non-LGB respondents, LGB respondents also perceived the climate as accepting, especially in the closed-ended portion of the climate question.

Similarly, LGB faculty did not elaborate more than their non-LGB colleagues with their quotes. When LGB students were asked to elaborate on their responses, they were more likely to say that while there is a general feeling of acceptance, there are not particular efforts to show acceptance toward LGB individuals either.

Similar studies have reported on climate for lesbian, gay, bisexual, transgender, queer, and asexual (LGBTQIA) students and faculty and mostly across an entire university (CEC, 2010; Brown and Gortmaker, 2009; Rodriguez, 2014; CU-Boulder, 2010; Evans and Herriott, 2004). A few looked at climate in all of STEM, yet few have examined the climate for LGB students specifically in the natural sciences. A previous study, that conducted LGBT student interviews in an engineering department at two rural, mid-western institutions, found engineering to be heteronormative and disconnected from the LGBTQIA community (Trenshaw et al., 2013). In another study, all students on a campus in North Florida were surveyed to determine the climate for lesbian, gay, bisexual, and transgender (LGBT) students (CEC, 2010). They found that students who identified as LGBT were more likely to perceive the climate as less accepting than their non-LGBT peers. This does not appear to be the case for this study, perhaps because the university is situated in the center of a city with strong LGB community. The LGB respondents in our study perceived the climate similarly to that of non-LGB respondents.

4.2 LGB Faculty are Comfortable Talking about their Sexual Orientation with Students

Given that the climate of the university was reported as supportive and accepting, were LGB faculty comfortable talking about their sexual orientation with students? In general, my evidence shows that LGB faculty respondents were comfortable talking about their sexual orientation on campus with both students and colleagues. More faculty reported being comfortable talking about their sexual orientation with their colleagues than with students. Similarly, a majority of LGB student respondents reported being

comfortable talking about their sexual orientation with other students more than with faculty. However, faculty respondents reported that it is important to let students and faculty know about their sexual orientation, while student respondents reported it as less important. If faculty are comfortable talking about their sexual orientation with students, but students are not aware they exist, then this suggests faculty may not be talking about their sexual identities in the classroom or laboratory.

There is little to no research on the level of openness for LGB students and LGB faculty in science or how comfortable they are talking about their sexual orientation. However, there was a climate study done on fourteen science and engineering faculty, who self-identified as lesbian and gay (Bilimoria and Stewart, 2009). The faculty in this previous study have reported choosing various levels of openness about their sexual orientation at different stages in their careers, such as being closeted, completely out, and selectively out. This study found that LGB faculty participants were more likely to be out to colleagues, but not to undergraduate students (Bilimoria and Stewart, 2009). It is very common for LGB people to use these strategies to manage social stigmas that may be present toward them. It is a survival mechanism that can carry additional burdens of stress in hiding or censoring one's sexual orientation (LaSala et al. 2008).

The implications of these findings are that LGB faculty are comfortable talking about their sexual orientation with both students and faculty, yet they are potentially not talking to students about their identity as much as with faculty. It may be that faculty are not sure when and how to talk to students about their sexual identity, given the perceived nature of science as objective and unbiased, where one's personal identity is quite often seen as irrelevant or unimportant in science classrooms or laboratories. Based on this evidence, I have recommended that LGB faculty and LGB students, who are comfortable talking about their sexual identities, network with other LGB professionals in their respective fields. This would increase representation of LGB individuals in science as well as bring

awareness to the lack of representation of people with personal identities and struggles that often get overlooked in science.

4.3 Natural Science Students are Unaware of LGB Faculty in their Departments

What was most surprising in this study was that despite faculty being comfortable to talk about their sexual orientation with students, most student participants were unaware that lesbian and gay faculty exist in their department. There were two main goals to my LGB visibility research questions: To determine if there are LGB faculty in the natural sciences, and to determine if students were aware of their presence. In this study, LGB faculty visibility was significantly different between student and faculty respondents. We found that more than half of student respondents were not aware of any LGB faculty members in their department. However, all faculty respondents were aware of at least one LGB faculty in their department, except in Chemistry. Furthermore, faculty respondents self-identified as lesbian and gay in biology, physics, and earth science departments, which confirmed their presence. My findings confirmed that LGB faculty in fact do exist in the natural sciences, and majority of natural science students are not aware of their presence.

The initial motivation for this study was the perception that there is lack of visibility of LGB individuals in the natural sciences. In recent years, as diversity slowly increases in the sciences for women and people of color, there still is major disconnect with being a scientist and identifying as LGB. LGB individuals may not see themselves in science, and the scientific community has not explicitly engaged in outreach and recruitment of LGB individuals. Given the potential disconnect between scientists and LGB individuals, it was not surprising to see that more than half of student respondents reported they were not aware of any LGB faculty in their department. It may not be easy for some LGB individuals to come out to their non-LGB peers, due to LGB individuals existing in a heteronormative society in which people are typically assumed heterosexual.

Heteronormative relates to a world view that heterosexuality is the normal or preferred sexual orientation. This is what makes these findings truly significant. LGB students in the natural sciences may find it harder to find role models than non-LGB peers, in a heteronormative society and the heterosexual-dominant field of science. In this study and at this campus, it was disappointing to see that so many LGB student respondents were not aware of the presence of LGB science faculty. This represents a missed opportunity for LGB students to identify with LGB role models in their field.

4.4 Implications of the Key Findings

There has been little research on LGB faculty visibility in the natural sciences, and even fewer studies attempting to look at students' awareness of LGB faculty. Much of the previous research on LGB faculty related to the faculty's work climate (Bilimoria and Stewart, 2009; LaSalla et al., 2008). A previous study was done on LGBT students in high school and the steps they take in looking for the right mentor (Mulcahy et al., 2014). This previous study identified that LGBT students looked for two factors when determining a suitable mentor: the mentor self-identified as LGBT or if they displayed Safe Zone stickers on their office doors. They also looked for qualities in a mentor like good listeners, nonjudgmental, and willing to learn about LGBT issues. Given that our LGB student respondents are unaware of the LGB faculty that are available to them as mentors they are at a disadvantage compared to students that are able to find suitable mentors.

The implications were that an accepting climate is not enough to increase visibility or to create an inclusive environment for all students. It is the role of university administrators to address the issue of invisibility and acceptance among sexual orientation minorities by engaging their students and faculty about LGB issues. Science

faculty and administrators, should be able to address the many dimensions of climate for LGB individuals, especially the pressure to remain invisible. Climate and visibility go hand and hand. By acknowledging that some students and faculty identify as LGB, and creating an open and inclusive setting for them, it would directly benefit lesbian, gay, and bisexual individuals as well as others. Efforts by administrators and faculty are needed to encourage LGB faculty, LGB students, and LGB staff to network and connect with other LGB professionals to reduce the fearfulness and isolation that occurs among LGB individuals. In the future, science departments should promote LGB organizations and events to show an outward acceptance to the LGBTQIA community, since there has been little attempt with science departments to display LGBTQIA pride materials in the past.

The findings of this study have implications for future research geared toward LGB visibility in the sciences and how LGB students are directly affected by the lack of role models. Unlike faculty of color, who can immediately become role models to students of color, this process must be more intentional to bring role models to LGB students. While student respondents in this study exposed the lack of visibility among LGB faculty in the natural sciences, we encourage larger scale studies to conduct a more in-depth study to better understand why students are not aware of LGB faculty and what LGB faculty can do to become more visible to their students. These findings also have direct implications to be addressed by both LGB faculty that would like to be more visible among their students and for university administrators to create a more inclusive environment for aspiring science professionals who are LGB.

4.5 Study Limitations

The present study had certain limitations, in particular in regard to the sampling procedures, the location of the university, and the focus on sexual orientation. Due to university constraints, the students invited to participate in the study were a random subsample to prevent survey fatigue at the university more generally. This reduced our

sample size significantly. For future studies, inviting all students enrolled in the sciences to participate would be optimal. Additionally, the university randomization procedure did not stratify by departments. As such, one larger department, biology, dominated the overall sample. To avoid this, future studies could employ a randomized stratified sample approach. Since the university under study is located in one of the most tolerant and accepting places in the U.S. for LGB individuals, other institutions will certainly exhibit different levels of LGB visibility and climate than this university. Finally, this study focused on issues of sexual orientation, excluding investigations of issues related to gender identity. Individuals that identify as transgender may face different challenges and forms of discrimination than individuals that identify as LGB. While our study addresses LGB visibility and climate, LGB individuals are often referred to as belonging to the LGBTQIA community. Addressing these issues related to LGB individuals largely benefits the LGBTQIA community as a whole.

4.6 Conclusion

This study investigated visibility and climate of LGB individuals in the natural sciences at an urban, public, minority-serving institution. While most respondents agreed that the climate in natural sciences is accepting of LGB individuals and LGB faculty are open about sexual orientation, the majority of students were unaware of the presence of LGB scientists in their science departments. These data reinforce the need for LGB faculty to become more visible among their students to bridge the gap between faculty and students. Further, these data raise questions as to whether a non-hostile, non-discriminating, overtly accepting climate, could lead to LGB faculty and students choosing to remain invisible about their sexual identities. To address these issues, it is recommended that a committee be created for LGB scientists that would like to become more visible, in particular for LGB faculty who would like to be more visible to their students.

Box 1: Survey Questions on LGB Student & LGB Faculty Awareness (Adapted from *CU-Boulder, 2010*)		
#	**Survey Prompt**	**Response**
1	Since you began attending/working at SFSU, how many lesbian, gay, or bisexual **STUDENTS** have you been aware of in the College of Science and Engineering within your major department?	0 1-2 3-5 5-10 >10 Don't know
2	Since you began attending/working at SFSU, how many lesbian, gay, or bisexual **FACULTY** have you been aware of in the College of Science and Engineering within your major department?	

Box 1. Survey Questions on LGB Student and LGB Faculty Awareness. The first two survey questions that probed awareness of LGB students and LGB faculty are shown. The prompts are numbered in the order they appeared in the survey. The response choices for survey question 1 and 2 were kept the same and are listed under the third column, labeled response.

Box 2A: Survey Questions on LGB Student Perspectives about their Openness with their Sexual Orientation (Adapted from *Dewaele, 2014*)			
#	**Student Prompts**		**Responses**
3	I feel comfortable talking about my sexual orientation with...	Other students in my courses	Strongly Agree Agree Disagree Strongly Disagree
		Other students who I work closely with on campus	
		Faculty who teach me in a course	
		Faculty who I work with on research projects	
		Faculty who advise me	
4	It is important to let _____ know about my sexual orientation.	Other students in my courses	Strongly Agree Agree Disagree Strongly Disagree
		Other students who I work closely with on campus	
		Faculty who teach me in a course	
		Faculty who I work with on research projects	
		Faculty who advise me	

Box 2A. Survey Questions on LGB Student Perspectives about their Openness with their Sexual Orientation. Two LGB specific prompts that probe respondents level of openness with their sexual orientation are shown. The two prompts are listed in the second column and numbered in the ordered they appeared. The column to the right, the third column, contains the subcategories. This list was identical for each prompt. The answer choices are listed in the fourth column.

Box 2B: Survey Questions on LGB Faculty Perspectives about their Openness with their Sexual Orientation (Adapted from *Dewaele, 2014*)			
#	**Faculty Prompts**		**Responses**
3	I feel comfortable talking about my sexual orientation with...	Students that work in my laboratory	Strongly Agree Agree Disagree Strongly Disagree
		Students whom I advise	
		Students in my courses	
		Faculty colleagues in my department	
		Faculty in other science departments	
4	It is important to let _____ know about my sexual orientation.	Students that work in my laboratory	Strongly Agree Agree Disagree Strongly Disagree
		Students whom I advise	
		Students in my courses	
		Faculty colleagues in my department	
		Faculty in other science departments	

Box 2B. Survey Questions on LGB Faculty Perspectives about their Openness with their Sexual Orientation. The same two LGB specific prompts that probed students were used to probe faculty. The subcategories, in the third column, were slightly different than students. The possible responses are found in the fourth column.

Box 3: Survey Questions on Climate for LGB Students (Adapted from *UNF, 2010*)		
#	**Survey Prompt**	**Response**
5	How would you describe the climate for lesbian, gay, or bisexual students in the SFSU College of Science and Engineering?	Accepting Unaccepting Don't know
6	Do you believe that being openly lesbian, gay, or bisexual would negatively influence a student's academic experience in the SFSU College of Science & Engineering?	Yes No Don't know
7	During the current semester, how often have you heard a student, faculty, or staff member in the College of Science and Engineering within your major make disparaging remarks about lesbian, gay, or bisexual individuals	Never Seldom Sometimes Often Constantly

Box 3. Survey Questions on Climate for LGB Students. The three survey questions that probe respondents' perceptions of the climate for LGB students are shown. The prompts are numbered in the ordered they appeared in the survey. The responses for each survey question is listed under the third column.

Department	Response Rate %	Female %	Under-graduate %	Completed 3 or more semesters at SFSU %	People of Color %	LGB %
ALL n=218	**29**	**61**	**81**	**78**	**76**	**16**
BIO n=142	21	64	81	82	84	18
CHEM n=39	29	72	95	82	80	16
EARTH n=7	29	43	43	57	14	0
PHYS n=30	35	33	70	57	50	13

Table 1. Student Respondent Demographics. The student respondents' demographics and response rates by department are shown. All demographics and response rates are shown in percentages. The response rate is equal to the total number of students invited divided by the total number of students that completed the survey. The aggregated percentages from all departments are listed first and then followed by the percentages disaggregated by department. The departments are listed alphabetically.

Department	Female %	Under-graduate %	Completed 3 or more semesters at SFSU %	People of Color %
ALL n=35	**60**	**80**	**83**	**66**
BIO	60	76	84	72
CHEM	50	83	83	67
EARTH	0	0	0	0
PHYS	75	100	75	25

Table 2. LGB Student Respondent Demographics. LGB student respondents' demographics by department are shown. All demographics are shown in percentages. The aggregated percentages from all departments are listed first and then followed by the percentages disaggregated by department. The departments are listed alphabetically

Department	Response Rate %	Female %	Full Professor %	Taught 3 or more semesters at SFSU %	People of Color %	LGB %
ALL n=47	**52**	**43**	**62**	**96**	**32**	**17**
BIO n=24	53	46	67	96	38	17
CHEM n=9	41	33	67	100	44	0
EARTH n=9	82	33	67	100	22	22
PHYS n=5	42	60	60	100	0	40

Table 3. Faculty Respondent Demographics. The faculty respondents' demographics and response rates by department are shown. All demographics and response rates are shown in percentages. The response rate is equal to the total number of faculty invited divided by the total number of faculty that completed the survey. The aggregated percentages from all departments are listed first and then followed by the percentages disaggregated by department. The departments are listed alphabetically.

Department	Female %	Full Professor %	Taught 3 or more semesters at SFSU %	People of Color %
ALL n=8	**25**	**50**	**88**	**50**
BIO	25	25	75	75
CHEM	0	0	0	0
EARTH	0	100	100	50
PHYS	50	50	100	0

Table 4. LGB Faculty Respondents Demographics. LGB faculty respondents' demographics by department are shown. All demographics are shown in percentages. The aggregated percentages from all departments are listed first and then followed by the percentages disaggregated by department. The departments are listed alphabetically.

LGB Faculty	I do not remember particular efforts to demonstrate acceptance or specific instances that would suggest lack of acceptance. Not really certain of the student's perspective...I know that they appreciate me being out, but don't know how things are overall for them. -Biology
	As a gay man, I have always felt the strong support of my colleagues -Earth Science
	I have not witnessed any negative attitudes or actions against LBG students in my department either in their presence or in conversations that took place without known LGB students present. I have also perceived known (out) LGB students to be strongly supported and to flourish in my department. -Physics
non-LGB Faculty	My classes generally address questions relevant to the LGBT community in at least some way. In my lab and in the labs of close colleagues, students appear to feel free to be open about their sexual orientations. The students I know to be LGB are very open and do not appear to feel persecuted in any way. But I have no idea if the climate is the same in the rest of CoSE. Openness of LGB Faculty in Biology probably helps as well. -Biology
	This isn't something that has been openly discussed in my presence and my interactions with colleagues has been benign in respect to this topic. -Chemistry
	Many LGB students seem comfortable sharing their identities, and stay in the program. I would say very accepting except I don't really know what their experience is like, so "somewhat accepting" accounts for the possibility that not all LGB students feel fully accepted. -Earth Science

Table 5. Faculty Quotes Describing the Climate for LGB Students in their Science Department. Example quotes of faculty respondents from all four natural science departments describing the climate for LGB students are shown. Quotes are split into two categories: LGB faculty and non-LGB faculty. Each quote ends with the faculty respondent's affiliated department.

LGB Student	Most LGBT students I have met are Art, SXS, Ethnic Studies, Music, Business, or Communications majors.
	As part of the biology department, we have quite a few faculty who are out. I was fortunate enough to work with an openly out professor in my first research lab!
	Sexual identity is generally not brought up or discussed in CoSE classes.
	The subject is never brought up, so I find it difficult to navigate the department in terms of talking about sexuality.
	Representation MATTERS!!! A lot of the time my professors are cis and are straight.
	From the few times people have found out I'm a femme bisexual woman, they're more confused and ignorant. After they're done with ignorant questions, they seem to accept it and learn from it though.
	I would say that the biology department is pretty accepting because overall I don't think that there is much disrespect in that area, but at the same time it isn't talked about a lot, so I wouldn't say it is very accepting.
	Some faculty do not understand gender identity.
	Asian American studies major is very accepting, not really sure about Bio dept.
	There is no openly shown acceptance in CoSE. A queer person just assumes that everyone is not very accepting.
non-LGB Student	I have never heard anyone talk down about LGB, but it's also not really mentioned too often in the classroom.
	I have not met anyone that is lesbian, gay, or bisexual. I had never asked anyone for sexual orientation or preference.
	Science is predominantly a cis gendered male dominated field. The topic of sexuality is never really a factor when everyone is simply trying to study and pass.
	The topic is not addressed normally, but there isn't blatant discrimination.
	There are no special accommodations for them, but I wouldn't be sure if they would need it. I'm not sure as a heterosexual person what I would need if the tables were turned. Not a lot of feelings get discussed in science, which is why it's hard to exclude people.
	One of our professors got married to her partner, and the class was very accepting and applauded.
	When talking about their significant other professors are very inclusive and use neutral pronoun and examples.
	This student may be an outlier, but a male friend in biology I was speaking with stated, "there are too many gay people at state" in a way that didn't sound entirely positive. A few men I've overheard in conversation still have that fragile masculinity that likes to devalue gay men to boost their self-esteem, as well.

Table 6. Biology Student Quotes Describing the Climate for LGB Students in their Science Department. Example quotes of Biology students describing the climate for LGB students in their department are shown. Quotes are split into two categories: LGB faculty and non-LGB faculty.

LGB Student	There is general acceptance at the school, it is fine. The representation is poor in my chemistry department. LGBTQ+ is not particularly accepted inherently in the Chemistry department.
	In the Chemistry department, we don't care about sexual identifications.
non-LGB Student	I would only say somewhat accepting because I don't feel that those groups are well represented in our department.
	People seem to tolerate it, but not embrace it.
	You don't really see anyone formally coming out in this field.
	I have experienced positive collaboration in and outside of the classroom with all students (straight, bi, gay, and lesbian).
	I see students who are openly lesbian, gay, or bisexual and they haven't been looked down upon by their peers.

Table 7. Chemistry Student Quotes Describing the Climate for LGB Students in their Science Department. Example quotes of Chemistry students describing the climate for LGB students in their department are shown. Quotes are split into two categories: LGB faculty and non-LGB faculty.

LGB Student	NONE
non-LGB Student	While there would never be intentional exclusion, sometimes we say things unknowingly that excludes.
	This group seems to be catered to.
	I would have marked very accepting because I personally haven't witnessed any negative attitudes towards LGB. However, within the current constructs of society, I could not say that any minority is in a 100% accepting climate, in the SFSU CoSE as well as all other places in America.

Table 8. Earth Science Student Quotes Describing the Climate for LGB Students in their Science Department. Example quotes of Earth Science students describing the climate for LGB students in their department are shown. Quotes are split into two categories: LGB faculty and non-LGB faculty.

LGB Student	Although, there is not anything bad to say about the situation, there is not anything good either. I haven't heard or seen anything to say otherwise.
	I haven't seen any discrimination nor have I seen acceptance. I believe it would be an accepting climate if brought up.
non-LGB Student	In our department, there are a lot of students who are open about their sexuality. It's never been an issue.
	I have not seen nor identify any individuals that are LGB in both my and other science majors. I have not seen any misconduct on LGB people around my major department.
	People are open about their sexuality and I don't think there's any judgement.
	I don't feel that there is ever any hostility towards gay people. I believe they are in an environment where they are able to learn/teach without being hindered.
	I have experienced positive collaboration in and outside of the classroom with all students (straight, bi, gay, and lesbian).
	I see students who are openly lesbian, gay, or bisexual and they haven't been looked down upon by their peers.

Table 9. Physics Student Quotes Describing the Climate for LGB Students in their Science Department. Example quotes of Physics students describing the climate for LGB students in their department are shown. Quotes are split into two categories: LGB faculty and non-LGB faculty.

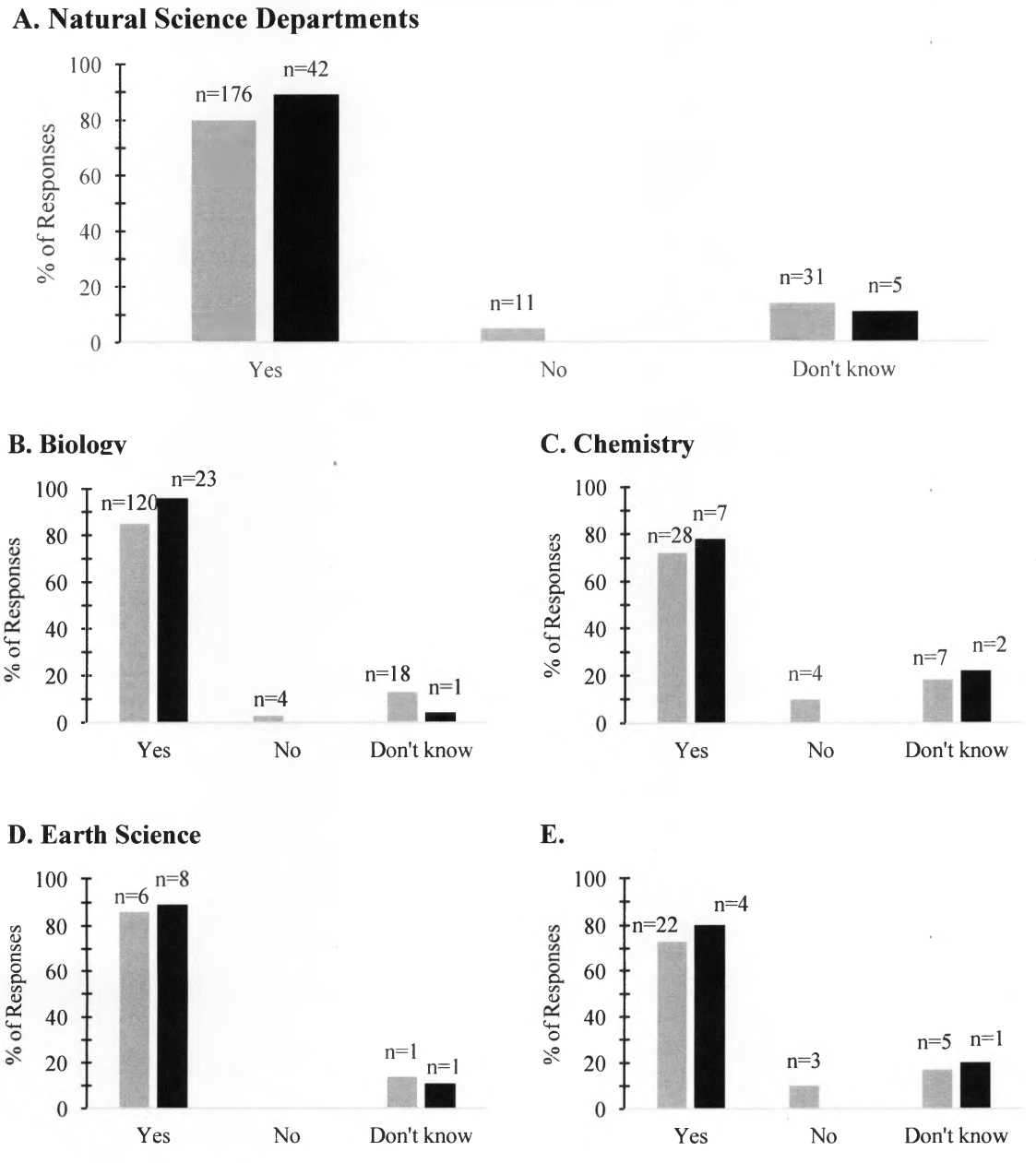


Figure 1. Student and Faculty Awareness of LGB Students in their Science Department. The percent of total responses for survey question 1 (see Box 1) are shown. n= the total number of respondents: student respondents are shown in grey columns and faculty respondents are shown in black columns. Figure 1A contains the responses of students and faculty from four natural science departments. The remaining subfigures, Figures 1B-1E, contain the responses disaggregated by department.

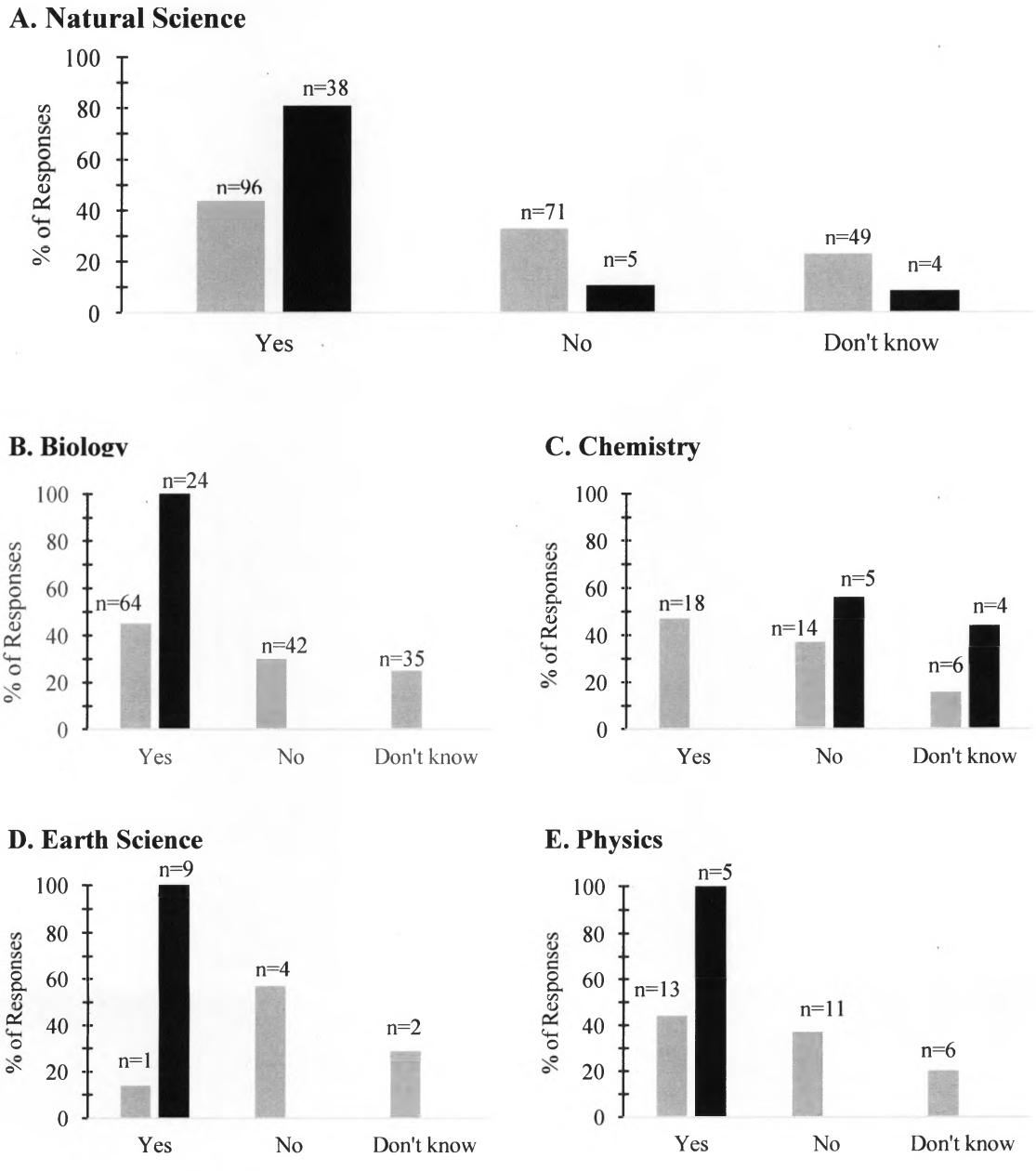


Figure 2. Student and Faculty Awareness of LGB Faculty in their Science Department. The percent of total responses for LGB faculty awareness, survey question 2 (see Box 1), are shown. n= the total number of respondents: student respondents are shown in grey columns and faculty respondents are shown in black columns. Figure 2A contains the responses of students and faculty from four natural science departments. The remaining subfigures, Figures 2B-2E, contain the responses disaggregated by department.

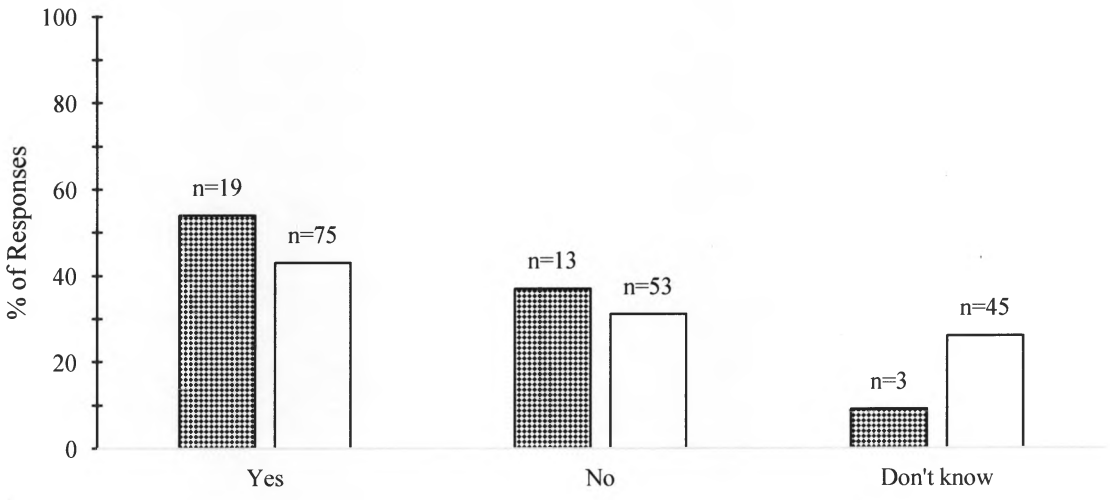
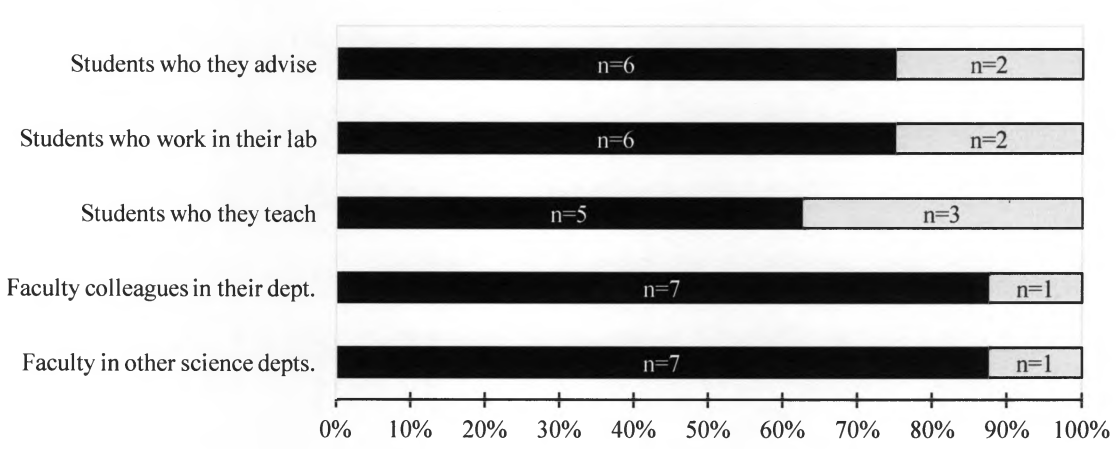


Figure 3. LGB Student and Non-LGB Student Awareness of LGB Faculty in their Science Department. The total percentage of student responses for survey question 2 (see Box 1) disaggregated by sexual orientation are shown. n= total number of student respondents: LGB students are shown in black diamond columns and non-LGB students are shown in white columns.

A. LGB Faculty Respondents (n=8)



LGB Student Respondents (n=35)

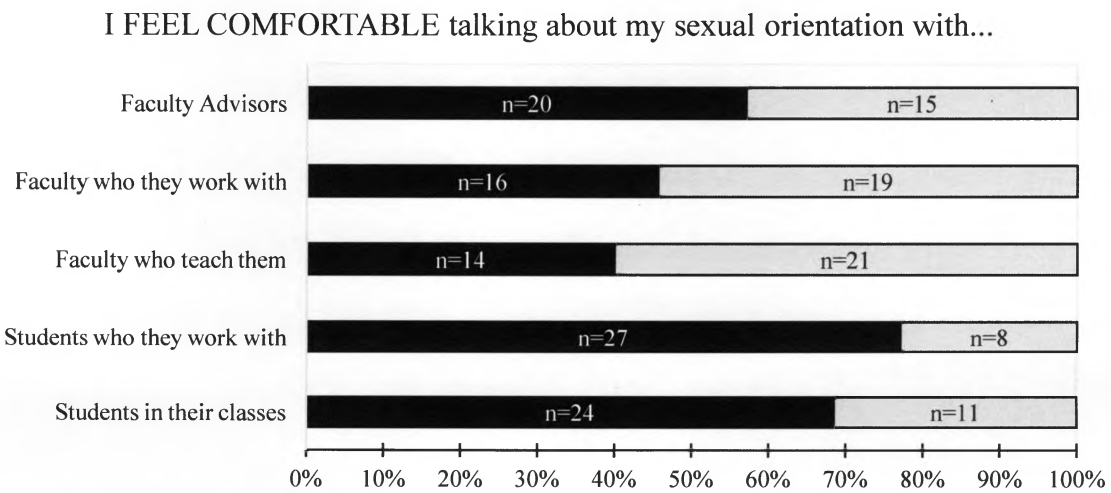
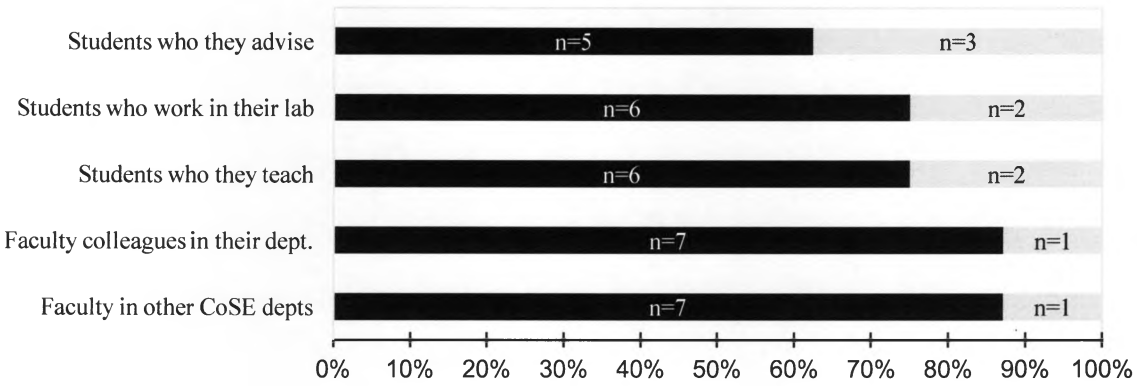


Figure 4. LGB Faculty and LGB Students Comfort Level in Talking about their Sexual Orientation. The total percentage of LGB respondents' responses regarding their level of openness in regard to their sexual orientation are shown. Figure 4A contains the total percentage of LGB faculty responses. Figure 4B contains total percentage of LGB student responses. n=total number of respondents. The survey prompt is listed at the top of the graph and the subcategories are listed to the left of the graph. The horizontal bars represent 100% of the responses for the given subcategory to the left of the bar. The coloring of the bar represents the various responses for each subcategory. For respondents that agreed with the prompt, the bar is shaded in black, and for respondents that disagreed, the bar is shaded in grey.

A. LGB Faculty Respondents (n=8)



LGB Student Respondents (n=35)

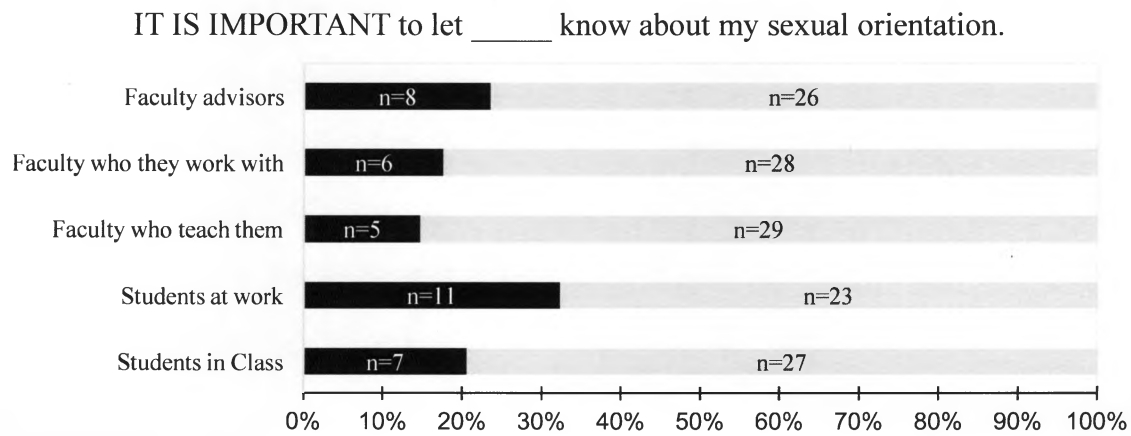


Figure 5. LGB Faculty and LGB Students on the Importance of Letting Others Know about their Sexual Orientation. The total percentage of LGB respondents' that replied to survey question 4 (see Boxes 2A-2B) are shown. Figure 5A contains the total percentage of LGB faculty responses. Figure 5B contains total percentage of LGB student responses. n=total number of respondents. The survey prompt is listed at the top of the graph and the subcategories are listed to the left of the graph. Respondents that agreed to the to the prompt are shown in black striped bars and respondents that disagreed are shown in light grey bars.

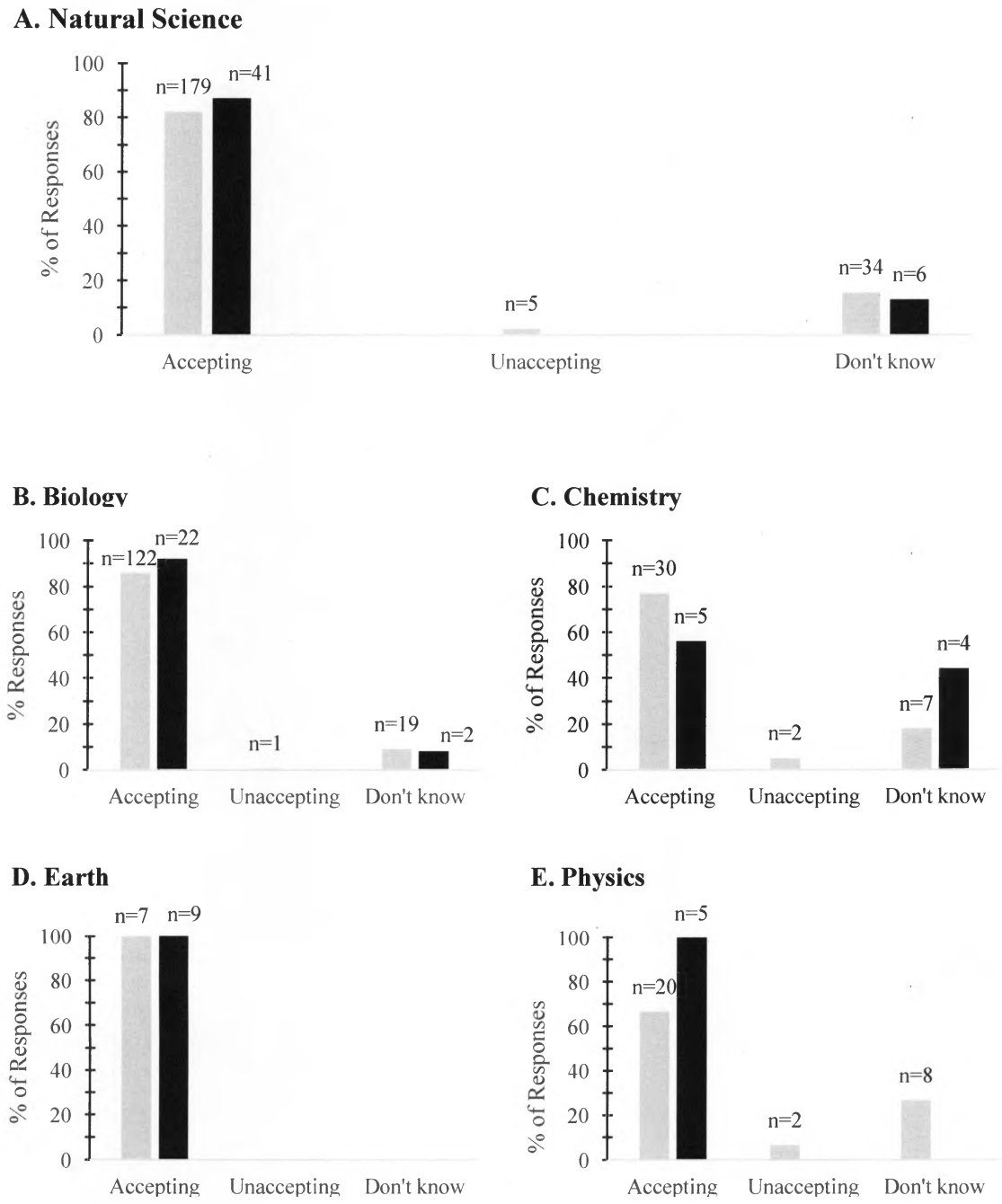
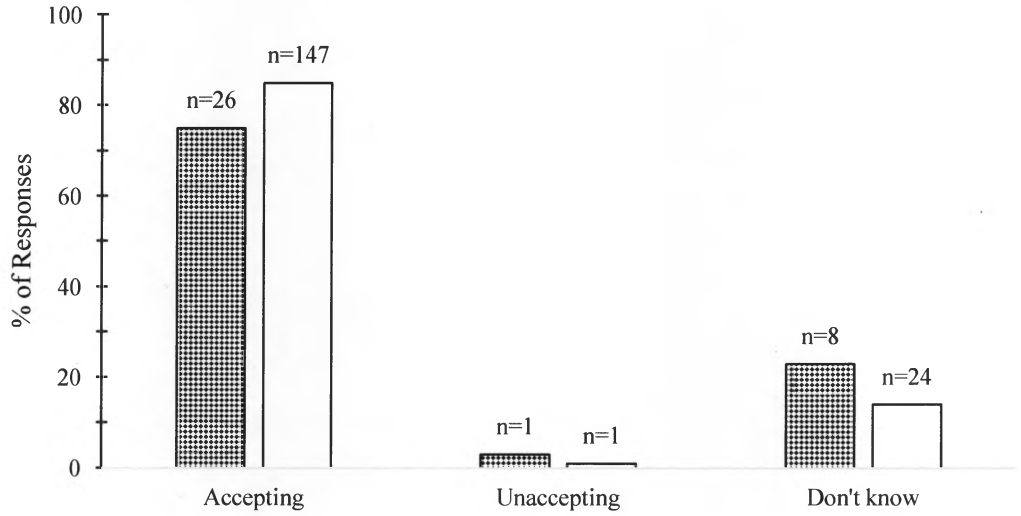


Figure 6. Student and Faculty Perceptions of Climate for LGB Students in their Science Department. Total Percentage of student and faculty responses to the general climate for LGB students, survey question 5 (see Box 3) in their departments are shown. Figure 6A contains all student and faculty responses with student responses in grey columns and faculty responses in black columns. Subfigures 6B-6E contain the same responses disaggregated by department.

A. Students



B. Faculty

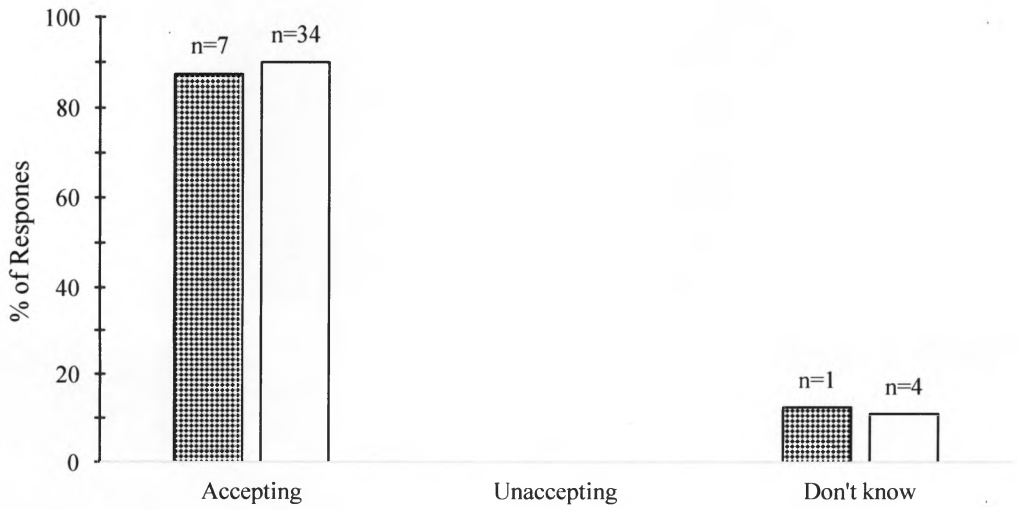
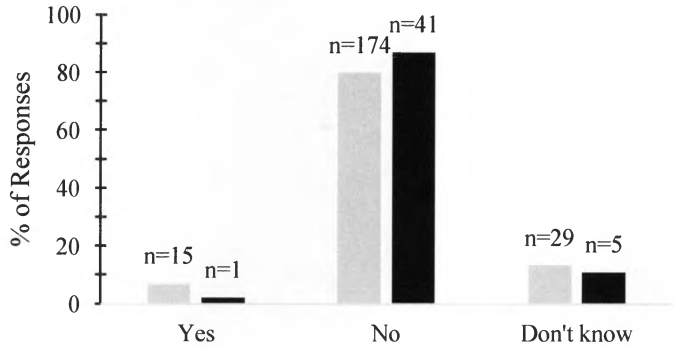
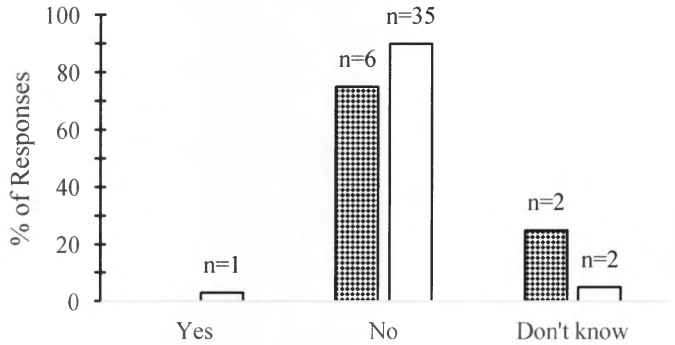


Figure 7. LGB and Non-LGB Respondent Perceptions of the Climate for LGB Students in their Department. The total percentage of all responses to climate on LGB students disaggregated by sexual orientation are shown. Figure 7A contains student responses with LGB respondents shown in black diamond columns and non-LGB respondents shown in white columns. Figure 7B contains faculty responses with the same coding for LGB and non-LGB respondents as students in Figure 7A.

A. Student vs. Faculty



B. LGB Faculty vs. Non-LGB Faculty



C. LGB Student vs. Non-LGB Student

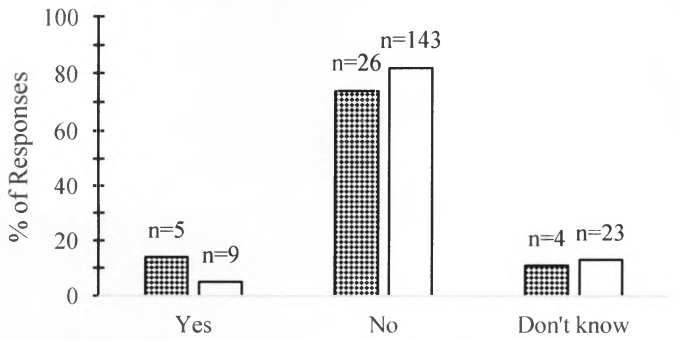


Figure 8. Student and Faculty Perceptions of the Influence of Being Openly LGB on a Student's Academic Experience in their Department. The total percentage of all responses to survey question 6 (see Box 3) regarding the respondents' perceptions of being openly LGB in their department are shown. Figure 8A contains student and faculty responses with the gray columns representing student respondents and the black columns representing faculty. Figure 8B contains only faculty responses that have been disaggregated by sexual orientation with LGB faculty represented by black diamond bars and non-LGB faculty represented by white bars. Figure 8C contains only student responses that have been disaggregated by sexual orientation with the same color coding as in Figure 8.

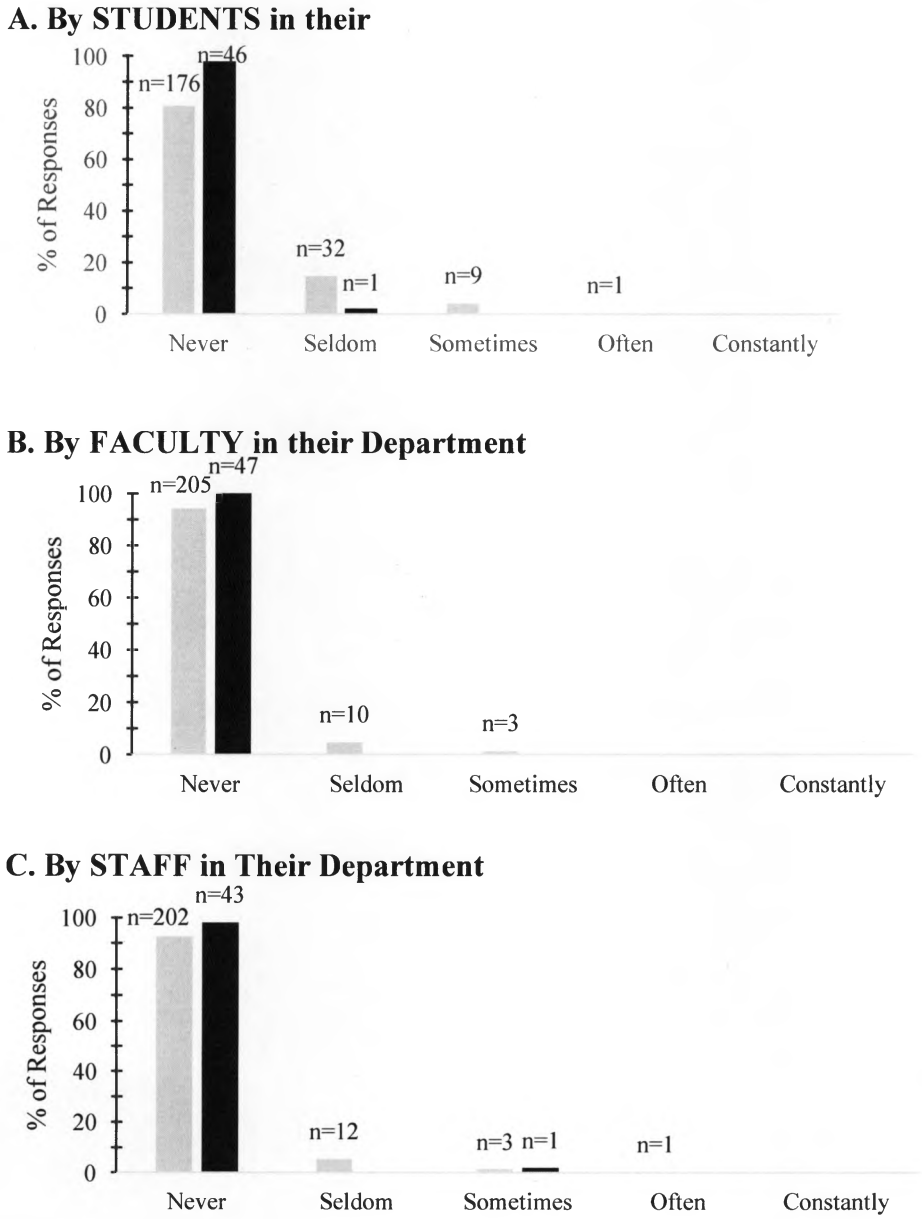


Figure 9. Student and Faculty Reports on Frequency of Disparaging Remarks about LGB People. Total percentage of all responses to survey question 7 (see Box 3) are shown. Student and faculty reports on the frequency of disparaging remarks about LGB people by students in their department are shown in Figure 9A, with student responses in grey columns and faculty responses in black. All reported responses on the frequency of disparaging remarks by faculty are shown in Figure 9B, with the same color coding as Figure 9A. Figure 9C, contains the responses to the frequency of disparaging remarks by staff in the department, also with the same color-coding as the previous figures.

REFERENCES

[ACHA] American College Health Association. (2010). American College Health Association. National College Health Assessment II Reference Group Data Report, Spring 2010. Linthicum, MD: American College Health Association.

Atkinson, D.R., Casa, A., and Neville, H. (1994). Ethnic Minority Psychologists: Whom They Mentor and Benefits They Derive from the Process. *Journal of Multicultural Counseling and Development*, Vol. 22, pp. 37-48.

Bilimoria, D., and Stewart, A. (2009). "Don't Ask, Don't Tell": The Climate for Lesbian, Gay, Bisexual, and Transgender Faculty in Science and Engineering. *NWSA Journal*, Vol. 21, No. 2, pp. 85-103.

Brown, R.D., and Gorthmaker, V.J. (2009). Assessing Campus Climates for Lesbian, Gay, Bisexual, and Transgender (LGBT) Students: Methodological and Political Issues. *Journal of LGBT Youth*, Vol. 6, pp. 416-435.

Clarke, R.A., Harden, S.L., and Johnson, W.B. (2000). Mentor Relationships in Clinical Psychology Doctoral Training: Results of a National Survey. *Teaching in Psychology*, Vol. 27. pp. 262-268.

[CU-Boulder] Colorado University, Boulder Campus. (2001). Web. *Campus Climate Survey*. Retrieved January 15, 2016., from <http://www.colorado.edu/pba/surveys/climate/01/methods.htm/>.

[CEC] Committee on Equity and Civility. (2006). University of North Florida's Campus Climate for Lesbian, Gay, Bisexual, and Transgender/Transsexual Students, Faculty, and Staff.

Cooper, K.M., and Brownell, S.E. (2016). Coming Out in Class: Challenges and Benefits of Active Learning in a Biology Classroom for LGBTQIA Students. *CBE-Life Sciences Education*, Vol. 15, No. 3, pp. 1-19.

Cronan-Hillix, T., Davidson, W.S., Cronan-Hillix, W.A., and Gensheimer, L.K. (1986). Student's Views of Mentors in Psychology Graduate Training. *Teaching of Psychology,* Vol. 13, pp. 123-127.

Dewaele, A., Van Houtte, M., and Vincke, J. (2014). Visibility and Coping with Minority Stress: A Gender-Specific Analysis Among Lesbians, Gay Men, and Bisexuals in Flanders. *Arch Sex Behavior*, Vol. 43, pp. 1601-1614.

Evans, N.J. and Herriott, T.K. (2004). Freshmen Impressions: How Investigating the Campus Climate for LGBT Students Affected Four Freshmen Students. *Journal of College Student Development*, Vol. 45, No. 3, pp. 316-332.

Herbenick, D. (2010). Sexual Behavior in the United States: Results from a National Probability Survey of Men and Women Age 14-94. *Journal of Sexual Medicine*, Vol. 7., No. 5, pp 255-266.

"Heteronormative" *Merriam-Webster Online Dictionary*. (2015). Web. Retrieved on September 26, 2016 from <http://www.merriam-webster.com/dictionary/heteronormative>.

Hollingsworth, M.A., and Fassinger, R.E. (2002). The Role of Faculty Mentors in the Research Training of Counseling Psychology Doctoral Students. *Journal of Counseling Psychology,* Vol. 49, pp. 324-330.

Johnson, W.B., Koch, C., Fallow, G.O., and Huwe, J. M. (2000). Prevalence of Mentoring in Clinical Versus Experimental Doctoral Programs: Survey Findings, Implications, and Recommendations. *Psychotherapy,* Vol. 37, pp. 325-334.

LaSala, M.C., Jenkins, D.A., Wheeler, D.P., and Fredriksen-Goldsen, K.I. (2008). LGBT Faculty, Research, and Researchers: Risks and Rewards. *Journal of Gay and Lesbian Social Services*, Vol. 20, No. 3, pp. 253-267.

Marine, S.B., (2011). Stonewall's Legacy: Bisexual, Gay, Lesbian, and Transgender Students in Higher Education. *ASHE Higher Education Report,* Vol. 37, No. 4.

Mulcahy, M, Dalton, S., Kolbert, J., and Crothers, L. (2016). Informal Mentoring for Lesbian, Gay, Bisexual, and Transgender Students. *Journal of Educational Research*, Vol. 109, No. 4, pp. 405-412.

[NAS] National Academy of Sciences. (2011). Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads. Washington, D.C: National Academies Press, 2011.

[PCAST] President's Council of Advisors on Science and Technology. (2012). Engage to Excel: Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics. (Washington, DC).

Rodriguez, M.H. (2014). Assessing LGBT Student Experiences and Perceptions: A Campus Climate Case Study. Master's Thesis, University of Southern California, 2014, ProQuest (1560575).

Schlosser, L.Z. Gelso, C.J. (2001). Measuring the Working Alliance in Advisor-Advisee Relationships in Graduate School. *Journal of Counseling Psychology,* Vol. 48, pp. 157-167.

Sedlacek, W.E., Benjamin, E., Schlosser, L.Z., Sheu, H.B. (2007). Mentoring in Academia: Considerations for Diverse Populations. In T.D. Allen & L.T. Eby (Eds.), *The Blackwell handbook of mentoring: A multiple perspectives approach* (pp. 259-280). Malden, MA: Blackwell.

Trenshaw, K.F., Hetrick, A., Oswald, R.F., Vostral, S.L., and Loui, M.C. (2013). Lesbian, Gay, Bisexual, and Transgender Students in Engineering: Climate and Perceptions., Frontiers in Education Conference. Oklahoma City, OK, USA, 23-26 October 2013.

Visibility" *Merriam-Webster Online Dictionary*. (2015). Web. Retrieved on September 26, 2016 from <http://www.merriam-webster.com/dictionary/visibility>.

Appendix 1: Investigating LGB Visibility and Climate in the Natural Sciences Student Survey

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (STUDENT)

Consent to Participate

PURPOSE OF THIS STUDY

Data collected from this confidential survey will be used for completion of a Master's degree in Earth & Climate Sciences at San Francisco State University. This survey is designed for ALL individuals to take regardless of their sexual orientation or gender identity. The information gathered will be used for research on lesbian, gay, and bisexual (LGB) issues in the College of Science and Engineering. You have been invited to participate because you are a student in the College of Science and Engineering. The survey questions will ask about your perceptions about LGB visibility and climate in the SFSU College of Science and Engineering. Your responses may be shared with attendees of research conferences and research collaborators, however we will never ask for your name or other personal information.

POTENTIAL RISKS

The primary risk is the potential loss of privacy, as demographic information and your insights about your perceptions of LGB visibility and climate in the SFSU College of Science and Engineering will be collected. To minimize this risk, the survey is completely anonymous. Original survey responses will only be accessible by Derik Gonzales and his research advisors, and all personal indicator information will be removed before any analysis is done. All data will be collected using a password protected survey system.

POTENTIAL BENEFITS TO YOU AND/OR SOCIETY

There are no direct benefits to participants. However, participation will allow you to share your perceptions of LGB visibility and climate in the SFSU College of Science and Engineering.

PAYMENT FOR PARTICIPATION

Each student invited to participate in the survey will be given the chance to enter into a drawing with over 30 prizes.

Prizes include:
-An iPad mini
-Five $50 Amazon gift cards
-Twenty-five $10 Amazon gift cards

If you would like to enter the drawing, you will be asked to submit your name and email at the end of the survey, so we can contact you if you win. This information will NOT be associated with your survey responses.

CONFIDENTIALITY

Your answers to this survey are anonymous, and only the researcher will have access to the information you share. If you choose to share your name and email to enter the drawing, this

information will be separated from your survey responses.

REQUIREMENTS
You must be 18 years of age or older to participate.

CONSENT PROCEDURE
You may choose to participate or not.

If you do wish to participate and share your survey responses, checking "yes" in the first survey question indicates your consent to the above conditions. If you do not wish to participate and share your survey responses as part of this research, you may simply check "No" in the first question of the survey. Please make your choice below.

CONTACT INFORMATION
Any questions or concerns should be directed to the Principal Investigator, Derik Gonzales or his research advisor, Professor Kimberly Tanner, at LGBCoSE@sfsu.edu.

* 1. Do you consent to share your experiences as a student in the SFSU College of Science and Engineering?

- ◯ Yes, I AM WILLING TO PARTICIPATE AND SHARE MY RESPONSES.
- ◯ No, I DO NOT WANT TO PARTICIPATE IN THE SURVEY.

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (STUDENT)

Visibility of LGB Students and LGB Faculty in College of Science and Engineering

2. Since you began attending SFSU, how many lesbian, gay, or bisexual STUDENTS have you been aware of in the College of Science and Engineering?

	0	1-2	3-5	5-10	>10	Don't Know
Within your major department	◯	◯	◯	◯	◯	◯
Within other science majors	◯	◯	◯	◯	◯	◯

3. Since you began attending SFSU, how many lesbian, gay, or bisexual FACULTY have you been aware of in the College of Science and Engineering?

	0	1-2	3-5	5-10	>10	Don't Know
Within your major department	◯	◯	◯	◯	◯	◯
Within other science departments	◯	◯	◯	◯	◯	◯

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (STUDENT)

Climate for LGB students and LGB faculty in the SFSU College of Science and Engineering.

4. How would you describe the climate for lesbian, gay, or bisexual students in the SFSU College of Science and Engineering?

	Very accepting	Somewhat accepting	Somewhat unaccepting	Very unaccepting	Don't know
Within your major department	◯	◯	◯	◯	◯
Within other science majors	◯	◯	◯	◯	◯

Please explain your answer choice in 1 to 2 sentences.

5. Do you believe that being openly lesbian, gay, or bisexual would negatively influence a student's academic experience in the SFSU College of Science and Engineering?

	No	Yes	Don't know
Within your major department	◯	◯	◯
Within other science majors	◯	◯	◯

6. During the current semester, how often have you heard a student, faculty, or staff member in the College of Science and Engineering make disparaging remarks about lesbian, gay, or bisexual individuals?

	Never	Seldom	Sometimes	Often	Constantly
Students in your major department	○	○	○	○	○
Students in other science majors	○	○	○	○	○
Faculty in your major department	○	○	○	○	○
Faculty in other science departments	○	○	○	○	○
Staff members in your department	○	○	○	○	○
Staff members in other science departments	○	○	○	○	○

If you have experienced disparaging remarks toward LGB people, please describe in 1 to 2 sentences.

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (STUDENT)

A Few Last Questions About You...

7. What is your major department in the College of Science and Engineering at SFSU?

- ◯ Biology
- ◯ Chemistry and Biochemistry
- ◯ Earth and Climate Sciences
- ◯ Physics and Astronomy
- ◯ Other (please specify)

8. Which of the following describes your current student status?

- ◯ Undergraduate
- ◯ Graduate
- ◯ Other (please specify)

9. How many semesters have you completed at SFSU?

- ◯ 0
- ◯ 1-2
- ◯ 3-4
- ◯ 5-6
- ◯ 7-8
- ◯ 9-10
- ◯ 11-12
- ◯ 12+

10. Are you a transfer student?

- ◯ Yes
- ◯ No

11. Which of the following *best* describes you? (select all that apply)

- [ ] Hispanic or Latino
- [ ] Black or African American
- [ ] Pacific Islander
- [ ] Asian
- [ ] Native American
- [ ] White
- [ ] Decline to answer
- [ ] Other (please specify)

12. Which of the following *best* describes your age?

- ◯ 18-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45-54
- ◯ 55-64
- ◯ 65-74
- ◯ 75 years or older
- ◯ Decline to answer

13. Which of the following *best* describes you?

- ◯ Male
- ◯ Female
- ◯ TransMale/Transman
- ◯ TransFemale/Transwoman
- ◯ Genderqueer
- ◯ Decline to answer
- ◯ Something else not listed (please specify)

* 14. Which of the following *best* describes your sexual orientation?

- ◯ Lesbian
- ◯ Gay
- ◯ Bisexual
- ◯ Straight
- ◯ Decline to answer
- ◯ Something else not listed (please specify)

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (STUDENT)

Lesbian, Gay, and Bisexual Visibility

15. I FEEL COMFORTABLE talking about my sexual orientation with...

	Strongly Agree	Agree	Disagree	Strongly Disagree
other students in my courses	○	○	○	○
other students who I work closely with (e.g. in a lab, other on-campus job, or a study group)	○	○	○	○
faculty who teach me in a course	○	○	○	○
faculty who I work with on research projects	○	○	○	○
faculty who advise me	○	○	○	○

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (STUDENT)

Lesbian, Gay, and Bisexual Visibility (continued)

16. IT IS IMPORTANT to let _____ know about my sexual orientation.

	Strongly Agree	Agree	Disagree	Strongly Disagree
other students in my courses	○	○	○	○
other students who I work closely with (e.g. in a lab, other on-campus job, or a study group)	○	○	○	○
faculty who teach me in a course	○	○	○	○
faculty who I work with on research projects	○	○	○	○
faculty who advise me	○	○	○	○

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (STUDENT)

If you would like to be entered in the drawing...

17. If you would like to be entered in the drawing to potentially win a prize, please enter your name and email address below.

This personal information will in NO WAY be affiliated with your responses to the previous questions on this survey.

Name:

Email Address:

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (STUDENT)

Thank you for completing the survey

This is the end of the survey!

Thank you very much for your participation!

If you have any questions, please don't hesitate to contact me at LGBCoSE@sfsu.edu.
-Derik Gonzales

Appendix 2: Investigating LGB Visibility and Climate in the Natural Sciences Faculty Survey

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

Consent to Participate

PURPOSE OF THIS STUDY

Data collected from this confidential survey will be used for completion of a Master's degree in Earth & Climate Sciences at San Francisco State University. This survey is designed for ALL individuals to take regardless of their sexual orientation or gender identity. The information gathered will be used for research on lesbian, gay, and bisexual (LGB) issues in the College of Science and Engineering. You have been invited to participate because you are a faculty member in Biology, Physics & Astronomy, Earth & Climate Sciences, or Chemistry & Biochemistry in the SFSU College of Science and Engineering. The survey questions will ask about your perceptions about LGB visibility and climate in the SFSU College of Science and Engineering. Your responses may be shared with attendees of research conferences and research collaborators, however we will never ask for your name or other personal information.

POTENTIAL RISKS

The primary risk is the potential loss of privacy, as demographic information and your insights about your perceptions of LGB visibility and climate in the SFSU College of Science and Engineering will be collected. To minimize this risk, the survey is completely anonymous. Original survey responses will only be accessible by Derik Gonzales and his research advisors, and all personal indicator information will be removed before any analysis is done. All data will be collected using a password protected survey system.

POTENTIAL BENEFITS TO YOU AND/OR SOCIETY

There are no direct benefits to participants. However, participation will allow you to share your perceptions of LGB visibility and climate in the SFSU College of Science and Engineering.

PAYMENT FOR PARTICIPATION

Faculty participants may request a $10 Amazon gift card for their efforts. Faculty members from Biology, Physics & Astronomy, Earth & Climate Sciences, and Chemistry & Biochemistry are eligible to participate in the survey and receive a gift card.

To receive your gift card, you will be asked to submit your name and email address at the end of the survey, so we can contact you to deliver your gift card. This information will NOT be associated with your survey responses.

CONFIDENTIALITY

Your answers to this survey are anonymous, and only the researcher will have access to the information you share. If you choose to share your name and email to enter the drawing, this information will be separated from your survey responses.

REQUIREMENTS

You must be 18 years of age or older to participate.

CONSENT PROCEDURE
You may choose to participate or not.

If you do wish to participate and share your survey responses, checking "yes" in the first survey question indicates your consent to the above conditions. If you do not wish to participate and share your survey responses as part of this research, you may simply check "No" in the first question of the survey. Please make your choice below.

CONTACT INFORMATION
Any questions or concerns should be directed to the Principal Investigator, Derik Gonzales or his research advisor, Professor Kimberly Tanner, at LGBCoSE@sfsu.edu.

* 1. Do you consent to share your experiences as a faculty member in the SFSU College of Science and Engineering?

- ◯ Yes, I AM WILLING TO PARTICIPATE AND SHARE MY RESPONSES.
- ◯ No, I DO NOT WANT TO PARTICIPATE IN THE SURVEY.

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

Visibility of LGB Students and LGB Faculty in College of Science and Engineering

2. Since you began working at SFSU, how many lesbian, gay, or bisexual STUDENTS have you been aware of in the College of Science and Engineering?

	0	1-2	3-5	5-10	>10	Don't Know
Within your department	◯	◯	◯	◯	◯	◯
Within other science departments	◯	◯	◯	◯	◯	◯

3. Since you began working at SFSU, how many lesbian, gay, or bisexual FACULTY have you been aware of in the College of Science and Engineering?

	0	1-2	3-5	5-10	>10	Don't Know
Within your department	◯	◯	◯	◯	◯	◯
Within other science departments	◯	◯	◯	◯	◯	◯

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

Climate for LGB Students in the SFSU College of Science and Engineering.

4. How would you describe the climate for lesbian, gay, or bisexual STUDENTS in the SFSU College of Science and Engineering?

	Very accepting	Somewhat accepting	Somewhat unaccepting	Very unaccepting	Don't know
Within your department	◯	◯	◯	◯	◯
Within other science departments	◯	◯	◯	◯	◯

Please explain your answer choice in 1 to 2 sentences.

5. Do you believe that being openly lesbian, gay, or bisexual would negatively influence a student's academic experience in the SFSU College of Science and Engineering?

	No	Yes	Don't know
Within your department	◯	◯	◯
Within other science departments	◯	◯	◯

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

Climate for LGB Faculty in the SFSU College of Science and Engineering

6. How would you describe the climate for lesbian, gay, or bisexual FACULTY in the SFSU College of Science and Engineering?

	Very accepting	Somewhat accepting	Somewhat unaccepting	Very unaccepting	Don't know
Within your department	◯	◯	◯	◯	◯
Within other science departments	◯	◯	◯	◯	◯

Please explain your answer choice in 1 to 2 sentences.

7. Do you believe that being openly lesbian, gay, or bisexual would negatively influence a FACULTY member's career in the SFSU College of Science and Engineering?

	No	Yes	Don't know
Within your department	◯	◯	◯
Within other science departments	◯	◯	◯

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

Climate for LGB Students and LGB Faculty in the SFSU College of Science and Engineering

8. During the current semester, how often have you heard a student, faculty, or staff member in the College of Science and Engineering make disparaging remarks about lesbian, gay, or bisexual individuals?

	Never	Seldom	Sometimes	Often	Constantly
Students in your department	○	○	○	○	○
Students in other science departments	○	○	○	○	○
Faculty in your department	○	○	○	○	○
Faculty in other science departments	○	○	○	○	○
Staff members in your department	○	○	○	○	○
Staff members in other science departments	○	○	○	○	○

If you have experienced disparaging remarks toward LGB people, please describe in 1 to 2 sentences.

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

A Few Last Questions About You...

9. What is your department in the College of Science and Engineering at SFSU?

- ◯ Biology
- ◯ Chemistry and Biochemistry
- ◯ Earth and Climate Sciences
- ◯ Physics and Astronomy
- ◯ Other (please specify)

10. Which of the following describes your current status in the College of Science and Engineering?

- ◯ Full Professor
- ◯ Associate Professor
- ◯ Assistant Professor
- ◯ Emeritus Professor
- ◯ Lecturer
- ◯ Other (please specify)

11. How many semesters have you taught at SFSU?

- ◯ 0
- ◯ 1-2
- ◯ 3-4
- ◯ 5-6
- ◯ 7-8
- ◯ 9-10
- ◯ 11-12
- ◯ 12+

12. Which of the following *best* describes you? (select all that apply)

- [ ] Hispanic or Latino
- [ ] Black or African American
- [ ] Pacific Islander
- [ ] Asian
- [ ] Native American
- [ ] White
- [ ] Decline to answer
- [ ] Other (please specify)

13. Which of the following *best* describes your age?

- ◯ 18-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45-54
- ◯ 55-64
- ◯ 65-74
- ◯ 75 years or older
- ◯ Decline to answer

14. Which of the following *best* describes you?

- ◯ Male
- ◯ Female
- ◯ TransMale/Transman
- ◯ TransFemale/Transwoman
- ◯ Genderqueer
- ◯ Decline to answer
- ◯ Something else not listed (please specify)

* 15. Which of the following *best* describes your sexual orientation?

- ◯ Lesbian
- ◯ Gay
- ◯ Bisexual
- ◯ Straight
- ◯ Decline to answer
- ◯ Something else not listed (please specify)

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

Lesbian, Gay, and Bisexual Visibility

16. I FEEL COMFORTABLE talking about my sexual orientation with...

	Strongly Agree	Agree	Disagree	Strongly Disagree
students that work in my laboratory	◯	◯	◯	◯
students whom I advise	◯	◯	◯	◯
students in my courses	◯	◯	◯	◯
faculty in my department	◯	◯	◯	◯
faculty in other science departments	◯	◯	◯	◯

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

Lesbian, Gay, and Bisexual Visibility (continued)

17. IT IS IMPORTANT to let _____ know about my sexual orientation.

	Strongly Agree	Agree	Disagree	Strongly Disagree
students that work in my laboratory	○	○	○	○
students whom I advise	○	○	○	○
students in my courses	○	○	○	○
faculty in my department	○	○	○	○
faculty in other science departments	○	○	○	○

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

If you would like to receive a gift card...

18. If you would like to receive a $10 Amazon gift card, please enter your name and email address below.

This personal information will in NO WAY be affiliated with your responses to the previous questions on this survey.

Name:

Email Address:

Investigating LGB Visibility and Climate in the SFSU College of Science and Engineering (FACULTY)

Thank you for completing the survey

This is the end of the survey!

Thank you very much for your participation!

If you have any questions, please don't hesitate to contact me at LGBCoSE@sfsu.edu.
-Derik Gonzales