

UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

LGBQ IDENTITY AND E-CIGARETTE DEPENDENCE AMONG YOUNG ADULTS

A THESIS

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree of

MASTER OF SCIENCE

By

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Norman, Oklahoma
2022

LGBQ IDENTITY AND E-CIGARETTE DEPENDENCE AMONG YOUNG ADULTS

A THESIS APPROVED FOR THE
DEPARTMENT OF HEALTH AND EXERCISE SCIENCE

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Abstract:

Introduction: E-cigarette use is most prevalent among young adults (18-25-year-olds) and lesbian, gay, bisexual, and queer (LGBQ) people when compared to other age groups and heterosexual people. This study examined the relationship between LGBQ identity and e-cigarette dependence in LGBQ young adults.

Methods: Using the Lesbian, Gay, and Bisexual Identity Scale (LGBIS) subscales to assess LGBQ identity and the Penn State Electronic Cigarette Dependence Index (PSECDI) to assess dependence, different aspects of LGBQ identity were measured and analyzed using multiple linear regression to reveal their association with e-cigarette dependence in a sample (N=242) of LGBQ young adults who vaped and owned an e-cigarette at the time of the study. The study was cross-sectional, and responses were recorded via an online survey.

Results: Identity Superiority was found to be significantly and positively associated with dependence ($\beta = .227, p = .017$), and Identity Centrality was found to be significantly and negatively associated with dependence ($\beta = -.320, p = .005$). The other LGBIS subscales were not found to be significantly associated with dependence.

Conclusions: This study was the first to use the LGBIS and the PSECDI in conjunction to analyze e-cigarette dependence and LGBQ identity among young adult LGBQ people. It identified two aspects of LGBQ identity that were significantly associated with dependence.

Chapter 1

Introduction

People who identify as lesbian, gay, bisexual, and queer (LGBQ) report higher tobacco use rates than the heterosexual population (Grant Smith et al., 2018). While research focusing on this health inequity is becoming more commonplace, research focused on associating sexual identity and e-cigarette dependence in young adults is limited (Cramer et al., 2017; Emory et al., 2016). Literature has shown that it can be difficult for LGBQ people to form a positive sexual identity, especially when faced with the marginalization and the stigma that stem from heterosexual cultural norms in the United States (Mohr & Kendra, 2011). These negative experiences related to their sexual identity have been shown to lead to coping mechanisms such as tobacco use (Bennett et al., 2014).

Sexual identity is not the only known risk factor for e-cigarette use. BRFSS data has shown that e-cigarette use is most prevalent among the young adult (18- to 24-year-olds) population (9.2%) with 2.8 million young adults being e-cigarette users in 2016 (Mirbolouk et al., 2018). The reported percentage of young adults who use e-cigarettes gradually increased in the United States from 2017 (5.2%) to 2018 (7.6%) (Creamer et al., 2019). The theory of emerging adulthood suggests that risk taking behaviors such as these are a part of the identity formation and exploration process for emerging adults (Arnett, 2000).

Purpose of the Study

The purpose of this study is to examine the relationship between lesbian, gay, bisexual, and queer (LGBQ) identity and e-cigarette dependence in LGBQ young adults. Previous research has analyzed the association between lesbian, gay, and bisexual identity and smoking

dependence motives, such as urges and environmental cues to smoke (Grant Smith et al., 2018). LGBQ Identity is the central focus of this study because historically tobacco companies have targeted queer people to normalize and integrate tobacco use into the larger LGBQ culture (Jannat-Khah et al., 2018). Additionally, previous research has reported that sexual minority women are most susceptible to tobacco use due to risk factors associated with both their sexual identity as well as gender identity (Emory et al., 2016). Thus, gender identity will be analyzed as well due to its relationship with smoking behaviors.

Research Question

Is there a relationship between lesbian, gay, bisexual, and queer (LGBQ) identity and e-cigarette dependence in LGBQ young adults?

Subquestions (specific subsections of the LGBIS)

- a) How does Internalized Homonegativity relate to e-cigarette dependence?
- b) How does LGBQ Identity Uncertainty relate to e-cigarette dependence?
- c) How do LGBQ Identity Acceptance Concerns relate to e-cigarette dependence?
- d) How does LGBQ Identity Concealment Motivation relate to e-cigarette dependence?

Significance of the Study

Previous research has shown the prevalence of e-cigarette use is highest among the young adults and LGBQ populations (Creamer et al., 2019). However, the understanding of the associations between LGBQ identity and e-cigarette dependence among LGBQ young adults is limited. Previous studies have failed to analyze this association between LGBQ identity and e-cigarette dependence. Few studies that focus on e-cigarette use among young adults analyze

those who identify as LGBQ within the study, and few studies that focus on e-cigarette use among LGBQ people have the appropriate number of young adult respondents. This study will be able to address this gap in the literature while also providing further information on the relationship between e-cigarette dependence and LGBQ identity. This study will be the first to use the Lesbian, Gay, and Bisexual Identity Scale (LGBIS) created by Mohr et al. (2011) in conjunction with the Penn State Electronic Cigarette Dependence Index (PSECDI). The findings of this study can assist future interventions by allowing medical professionals to know which aspects of LGBQ identity are associated with e-cigarette dependence to address addiction in the LGBQ young adult population.

Delimitations

The parameters of this study are:

- Participants included in this study will self-identify as lesbian, gay bisexual, or queer.
- Participants who identify as heterosexual or other sexual identity will be excluded.
- Participants should be able to read English.
- Participants will be current e-cigarette users who have used their e-cigarette in the past 30 days.

Limitations

The study is limited in its ability to reach low income LGBQ people who may not have the resources to access a computer or be a part of an LGBTQ+ organization due to this study being distributed completely online with the help of the organizations and Prolific, a research recruitment website. Furthermore, the study is limited by the willingness to respond to surveys by participants who have historically been exploited by the scientific community. The threats to

internal validity include the current pandemic of COVID-19 shaping the perception of participants' use of e-cigarettes.

Operational Definitions

Electronic Cigarette: a device that contains a nicotine-based liquid that is vaporized within the device and inhaled by the user i.e., JUUL, STIG, etc.

LGBTQ: The abbreviation for lesbian, gay, bisexual, transgender, and queer, meant to serve as an all-encompassing way to reference all people who identify as sexual minorities and/or as gender minorities.

LGBQ: Abbreviation for lesbian, gay, bisexual, and queer; referring to sexual minorities.

Sexual Minority: Persons who identify as being either lesbian, gay, bisexual, or queer; includes any sexual orientation other than heterosexual (subject to an individual's identity, people who engage in same gender behavior may identify as heterosexual due to societal stigma (Mayer, et al. 2008)).

Queer: A term used to express the spectrum of identities and sexual orientations that are not cisgender/heterosexual. Queer is often used as an umbrella term to include people who do not identify as exclusively straight as well as people who identify as non-binary or other non-cisgender identities. For this project, queer is included in the study to reference people who identify as not heterosexual, but also not LGB.

Chapter 2

Literature Review

Introduction

This study is designed to understand what components of lesbian, gay, bisexual, and queer (LGBQ) identity are associated with e-cigarette dependence. Previous studies have shown higher prevalence of e-cigarette use among young adults and LGBQ people (Al Rifai et al., 2020; Fallin-Bennett et al., 2017; Mirbolouk et al., 2018). One study has previously looked at how LGBQ identity components are associated with smoking dependence motives using the Wisconsin Inventory of Smoking Dependence Motives (WISDM), among predominantly older participants (Grant Smith et al., 2018). However, no study has examined the potential association between LGBQ identity components and e-cigarette dependence among LGBQ young adults.

Prevalence of Young Adult E-Cigarette Use

E-cigarette use has been steadily increasing in the young adult population. In 2016 it was estimated that 2.8 million young adults were e-cigarette users (Mirbolouk et al., 2018). Then in the 2017 and 2018 National Health Interview Survey (NHIS) e-cigarette use was reported to be highest in the 18–24 year-old age group in 2017 (5.2%) and in 2018 (7.6%) (Creamer et al., 2019). Analysis of the 2019 NHIS revealed that this trend would continue as e-cigarette use was highest among 18-24 year old adults (9.3%), with the majority (56.0%) of young adults reporting that they had never smoked cigarettes (Cornelius et al., 2020). These findings coincide with the BRFSS statistics that show e-cigarette use is most prevalent among the young adult (18- to 24 year-old) population (9.2%) (Mirbolouk et al., 2018).

Young Adult Identity Formation

Young adulthood will be defined as the years of 18 to 25 for this study and the ages of 18 to 24 will be used as the grouping for emerging adults. Arnett (2000) found that emerging adults differ from other adults since most are often in the midst of attaining their education and training for future occupations. This age group has previously expressed their belief that they have yet to reach full adulthood (Arnett, 2000). According to the Theory of Emerging Adulthood, identity formation is a key feature that defines emerging adulthood (Arnett, 2000). While this process is experienced as an individual developmental process, the social and cultural contexts surrounding the individual influence the formation of identity (Schulenberg et al., 2004). Previous studies based on the Theory of Emerging Adulthood have found that this process of identity formation brings the individual a sense of responsibility, agency, and psychological maturity (Côté & Levine, 2002).

Identity formation in young adults is also characterized by stress due to the transition from adolescence to adulthood (Forster et al., 2018). Risky behaviors such as alcohol and drug use are common coping mechanisms young adults partake in (Forster et al., 2018). Arnett has suggested that the risk taking behaviors of emerging adults is a part of the identity formation and exploration process – through which one uses new experiences to shape the decision to settle down as an adult (Arnett, 2000). Additionally, risky behaviors are positively associated with peer influence among this age group (Riedijk & Harakeh, 2018). Previous research has shown emerging adults were more likely to perform risky behaviors when around a peer who was initially performing the risky behaviors (Riedijk & Harakeh, 2018; Roeser et al., 2019; Seddig, 2020). During this time of identity formation, individuals act upon the perceived attitudes of peers to maintain a positive social identity, leading to risk taking behavior (Seddig, 2020).

Young Adult Identity Formation & E-Cigarette Use

Studies have suggested peers have influence on individual health decision making and habit-forming processes, like tobacco use, among young adults (Filippidis et al., 2015). Evidence has shown that emerging adults in particular have adopted similar smoking behaviors of their peers (Harakeh et al., 2007). The individual may not necessarily have to know their peer personally, as similar results have been observed amongst strangers (Riedijk & Harakeh, 2018). When adult smokers were surrounded by other adults actively smoking, they were likely to imitate the smoking behaviors of strangers, even when their smoking cravings didn't coincide with the rate the stranger smoked (Harakeh et al., 2007). Furthermore, previous research on young adult daily smokers found that even passive exposure to e-cigarette use increased desire for e-cigarettes in young adults, adding to literature supporting the role peer use has in e-cigarette use (King et al., 2015).

LGBQ Identity Formation

Forming one's identity as a sexual/gender minority in the United States can come with difficulties due to the stress and discrimination associated with identifying as queer (Juster et al., 2016). A recent study interviewing 489 LGBTQ adults found that the majority of participants have experienced discrimination, with 57% having experienced slurs, 53% reporting microaggressions related to their sexual or gender identity, and 51% having experienced sexual harassment and/or violence due to their queer identity (Casey et al., 2019). This likelihood for encountering violence is commonplace for LGBQ people. A recent study analyzing the National Crime Victimization Survey (NCVS) in 2017 and 2018 found that LGBQ identity corresponded with an increase in violence when compared to heterosexuals for both males ($p < .05$) and females ($P < .05$) (Bender & Lauritsen, 2020). These findings are increasingly concerning when coupled

with data that shows 16% of LGBTQ adults reporting discrimination in medical settings, with 18% of LGBTQ adults reporting that they are so conditioned to anticipate discrimination that they avoid obtaining medical care altogether (Casey et al., 2019). A different study analyzing the effects of coping strategies performed during sexual identity formation in LGBTQ adults found that when participants avoided coping with their distress during identity formation, they were likely to experience frequent daily hassles ($p < .001$), perceived stress ($p = .015$) and higher allostatic load ($.006$) (Juster et al., 2016). This study found that when LGBTQ people sought after social support they would experience lower levels of perceived stress ($p = .048$) (Juster et al., 2016).

LGBQ Tobacco and E-cigarette Use

Coupled with the stresses of LGBTQ identity formation and targeting from tobacco companies, tobacco use has historically been a major health issue for the LGBTQ population and continues to be one today (Smith & Malone, 2003). In a previous study researching tobacco use among sexual minorities, it was found that the percentage of any tobacco use was 61% and the use of e-cigarette was 30% (Tamí-Maury et al., 2015). This study also found that among the participants in the study, lesbians had the highest percentage reporting tobacco use (40%) when compared to the gay (36.8), bisexual (15.8), and other (5.3) participants (Tamí-Maury et al., 2015). These findings are consistent with the 2016 BRFSS which reported lesbian or gay (7.0%) and bisexual (9.0%) participants having a high e-cigarette usage rate (Mirbolouk et al., 2018). In a 2013 nationally representative online survey of 17,522 U.S. adults, it was found that respondents who identified as LGBT used e-cigarettes (25.1%) and traditional cigarettes (32.4%) more than heterosexual respondents (14.3 and 20.3% respectively), however this study did not report the statistics for the different groups that make up the LGBT population (Huang et al.,

2016). Analysis of the National Adult Tobacco Survey revealed that within the LGBQ population, bisexual women were likely to be younger when they smoked their first cigarette than straight women ($p < .001$) and lesbian women ($p < .01$), demonstrating the difference in risks within subgroups of LGBQ people (Fallin et al., 2015).

LGBT adults have been found to have higher odds of being current e-cigarette users (OR 1.84, 95% CI) according to data from the Behavioral Risk Factor Surveillance System (BRFSS) as well as having a higher likelihood to engage in high risk behavior (OR 3.69, 95% CI), such as using non-prescribed drugs or receiving monetary or drug compensation for sex (Al Rifai et al., 2020). Analysis of the Health Information National Trends Survey revealed that ‘other tobacco use’ (defined as e-cigarettes, hookah, pipes, snus, and roll your own) mediated the association between e-cigarette information seeking and sexual identity (Wheldon et al., 2019).

LGBQ Identity and Tobacco Use

Previous studies have analyzed the reasons behind LGBQ tobacco use and have attempted to discern what about LGBQ identity is associated with tobacco use. A previous study that utilized interviews of nineteen LGBQ adults in rural Appalachia, Kentucky found key themes relating to identity and tobacco use (Bennett et al., 2014). Respondents reported that their tobacco use was associated in their minds to their Appalachian culture and that their use of tobacco was a stress coping method. It was also reported that a large amount of their stress came from their constant concealment of their LGBQ identity, while maintaining that their LGBQ identity was not the reason for their tobacco use (Bennett et al., 2014). In this study, tobacco use was assessed by a set of questions in interviews, asking whether they identified as a smoker, how many packs a day they smoked, prior use, and other tobacco products used (Bennett et al., 2014)

Another study gathered key themes from 23 leaders of LGBTQ organizations in New York about their motivations for smoking and they reported that image, socializing, and stress coping were their primary reasons for smoking (Jannat-Khah et al., 2018). The reasoning behind the ‘image’ associated with using an e-cigarette was that it would be seen by others as a status symbol, which they felt would help them find a partner on queer dating apps like Grindr, Scruff, and Growler. Continuing with this trend of community associated with tobacco use, the ‘socializing’ reasoning behind tobacco use was centered around feeling included within queer social circles that would gather in places that would promote smoking, like hookah bars and parties (Jannat-Khah et al., 2018).

LGBQ Identity and Nicotine Dependence

In an effort to have a multidimensional measurement of LGBQ identity, the Lesbian, Gay, and Bisexual Identity Scale (LGBIS) was developed in 2011 (Mohr & Kendra, 2011). The LGBIS assesses LGBQ identity using eight subscales: Acceptance Concerns, Concealment Motivation, Identity Uncertainty, Internalized Homonegativity, Difficult Process, Identity Superiority, Identity Affirmation, and Identity Centrality. One previous study has used the LGBIS to analyze the relationship between LGBQ identity and cigarette dependence motives. In this study it was found that LGBQ Identity Affirmation was a predictor of primary dependence motives ($\beta = 0.44$), which would indicate that positive feelings about one’s LGBQ identity could be considered a risk factor to smoking dependence. LGBQ Identity Uncertainty was found to be a predictor of secondary dependence motives ($\beta = 0.43$), potentially indicating that stress associated with ones LGBQ identity can lead to smoking dependence (Grant Smith et al., 2018).

Nicotine Dependence

Dependence is the term used to refer to the physiological adaptations that occur when the central nervous system is affected by medications, causing a rebound effect when the medication is discontinued (O'Brien, 2011). Nicotine is the addictive stimulant found in the smoke of combustible cigarettes and in the aerosol of e-cigarettes (Talih et al., 2019; U.S. Department of Health and Human Services, 2016). Nicotine enters the body through the lungs when inhaled and moves to the brain within seconds, causing the user to feel the primary use effects of the drug, such as pleasure and stress relief (Benowitz, 2010; U.S. Department of Health and Human Services, 2016). As exposure to nicotine is repeated, tolerance is developed, and the primary use effects are reduced and physical dependence is induced (Benowitz, 2010). Nicotine dependence, also referred to as Tobacco Use Disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM V), is the neurobiological adaptation that occurs after repeated nicotine exposure and is characterized by tolerance, inability to quit, and physical withdrawal (Benowitz, 2010; O'Brien, 2011; U.S. Department of Health and Human Services, 2016).

E-cigarettes have the potential to introduce even more nicotine to users than combustible cigarettes, with previous research finding that fifteen 4 second puffs from a JUUL (a brand of e-cigarette) had the equivalent amount of nicotine (2.07 mg) as 1-2 combustible cigarettes (Talih et al., 2019; U.S. Department of Health and Human Services, 2016). The higher amounts of nicotine that e-cigarettes can deliver to users are a threat to generate nicotine dependence among young adults (Dawkins et al., 2016; U.S. Department of Health and Human Services, 2016). Furthermore, continued nicotine use associated with nicotine dependence can have long term health ramifications on the developing brains of young adults (Giedd, 2004; Goriounova & Mansvelder, 2012; U.S. Department of Health and Human Services, 2016). Keeping track of

nicotine can be difficult since nicotine concentrations in e-cigarettes can be varied by product and inaccurately labeled (Foulds et al., 2015; Goniewicz et al., 2015). Qualitative research which analyzed interviews of 62 young adults supported these findings. The study found that e-cigarette dependence has unique traits when compared to traditional tobacco dependence, including greater consumption of nicotine due to inability to track vaping frequency, greater social acceptability from peers, and general unawareness of dependence (Simpson et al., 2021). Therefore, to combat these issues, this study will utilize the PS-ECDI to assess nicotine dependence related to e-cigarette use rather than focusing solely on tobacco use. This research will address the calls for further research assessing dependence among young adults and LGBQ people.

Summary

Evidence has shown clear discrepancies between LGBQ tobacco use and heterosexual tobacco use, but there is little research that has analyzed dependence among young adults who identify as LGBQ. Previous research has called for further research in this group due to the multiple risk factors associated with their status as both sexual minorities and young adults (Grant Smith et al., 2018). This is the first study to use the LGBIS and the PSECDI together, addressing a gap in the understanding of how LGBQ identity components are related to e-cigarette dependence. Using these metrics, this study is also the first to assess e-cigarette dependence among LGBQ young adults, producing results that will be able to inform future tobacco research in this population.

Chapter 3

Methodology

Introduction

The purpose of this study is to assess how lesbian, gay, bisexual, and queer (LGBQ) identity components correlate with e-cigarette dependence in LGBQ young adults. Previous studies have analyzed the association of lesbian, gay, bisexual, and queer identity components and smoking dependence motives. A secondary purpose of this study is to analyze how COVID-19 has influenced e-cigarette dependence among LGBQ young adults. Young adults (9.2%) have been found to be the age group most susceptible to e-cigarette use, along with sexual minorities (lesbian and gay people 7.0% and bisexual people 9.0%) being most at risk of e-cigarette use (Mirbolouk et al., 2018). The sample for this study was young adults (age 18 to 25) who identify as lesbian, gay, bisexual, and queer (LGBQ) who had reported using e-cigarettes in the last seven days.

Research Design

This study is a cross sectional study that aims to assess the association between LGBQ identity components and e-cigarette use in young adults. The study is primarily quantitative and utilized scales that have been validated to assess LGBQ identity and e-cigarette dependence. The target sample size for this project was determined through power analysis using G*Power (Version 3.1.9.4) for linear regression analysis. The power analysis determined that 200 participants would be an adequate sample size for analysis. The researchers then sought to collect 250 participants to ensure power was reached in case of participant drop out or incomplete surveys.

Recruitment

Recruitment was initially done through online distribution of the survey with the aid of various lesbian, gay, bisexual, trans, and queer (LGBTQ) organizations and Facebook, Twitter, and Instagram groups (See Appendix A). A script was used to contact representatives from various organizations serving the LGBTQ community via email. Emails distributed by these LGBTQ organizations directed participants to the survey on an online survey distribution platform, Qualtrics. This initial data collection cycle was conducted from May 20th, 2021 to December 2021. A total of 106 valid responses were collected using this recruitment process.. This number was short of the 200 participants that was recommended after power analysis using G*Power that considered previous studies identified the recommended sample size. Prolific (a website that connects researchers to participants) was used to collect 151 participants to ensure power was reached in the event not all the requested responses were valid. Participants on Prolific were paid \$2.52 (\$22.63 an hour on average) for their completion of a survey. To ensure participants completed the survey, they imputed their Prolific ID at the beginning of the survey, which allowed the researchers to confirm completion of the survey. Funding for participants (\$500) came from the Robberson Research Grant. In total there were 257 valid responses collected for the study.

Sample

In total, the researchers collected 512 responses, with 230 responses being screened out at the beginning of the survey. There were 282 participants who qualified, 277 who consented to taking the study, and 257 responses were considered valid. After frequency tables were created with the 257 valid responses, certain groups were excluded due to their small sample size that would not allow for regression analysis.

Inclusion and exclusion criteria

Participants were asked a set of screening questions before being given the opportunity to respond to the LGBIS and the PS-ECDI. These questions assessed participants e-cigarette use, their sexual identity, and age to determine their inclusion criteria.

Inclusion criteria included the following:

- Participants must have used an e-cigarette or similar product in the last seven days.
- Participants must self-identify as lesbian, gay, bisexual, or queer.
- Participants must be between the ages of 18 and 25.
- Participants owned their own e-cigarette.

Participants were excluded if:

- They have not used an e-cigarette product in the past seven days.
- They are younger than 18 or older than 25.
- They identify as heterosexual or any other sexual identity.
- Participants who identify as transgender or non-binary but do not identify as a LGBQ since the LGBIS assesses LGBQ identity, and their .

Instrumentation

Data was collected via a 61 item survey containing two scales: the Lesbian, Gay, and Bisexual Identity Scale (LGBIS) (Appendix B) and the Penn State Electronic Cigarette Dependence Index (Appendix C). The Population Assessment of Tobacco and Health (PATH) demographic questions were used.

Lesbian, Gay, Bisexual, and Queer Identity

To assess LGBQ identity in participants, the Lesbian, Gay, and Bisexual Identity Scale was used. The LGBIS is a 27-item scale developed by (Mohr & Kendra, 2011) to assess eight identity dimensions related to sexual minority identity discussed in clinical and theoretical literature. The eight dimensions assessed by the LGBIS are five negative identity subscales (Internalized Homonegativity, Acceptance Concerns, Concealment Motivation, Identity Uncertainty, and Difficult Process) and three positive identity subscales (Identity Affirmation, Identity Superiority, and Identity Centrality) (Mohr & Kendra, 2011). The LGBIS uses a six-point Likert scale to score the items within the scale. Responses include 1 as “Disagree Strongly,” 2 as “Disagree,” 3 as “Disagree Somewhat,” 4 as “Agree Somewhat,” 5 as “Agree,” and 6 as “Strongly Agree.” The eight subscales are scored individually, with all subscales having three items, except Identity Centrality which has five items, by averaging the scores of the items. Difficult Process and Identity Centrality each have one item that should be reverse scored. This scale was selected due to its reliability and validity. All subscales test retest correlation coefficients ranging from .70 to .92 and had a Cronbach alpha between .72 and .94 (Mohr & Kendra, 2011).

Rationale for using the LGBIS

The LGBIS was selected for this study due to its ability to measure LGBQ identity with clear variables to analyze along with the high reported levels of consistency reliability. As a multidimensional measure of LGBQ identity, the LGBIS allows analysis of the relationship between e-cigarette dependence and the different components of LGBQ identity. When the LGBIS was developed, the population it was originally tested on was 654 university students whose mean age was 22.9 (SD = 5.6), which is within the age range of the current study.

However, the original study was predominantly white, and with the population being college educated, they were more likely to have resources and the support to comfortably express their sexual identity (Mohr & Kendra, 2011). Another study utilized the LGBIS to analyze the association between LGBQ identity and smoking dependence motives among a population that, while older ($M = 42.8$ years old $SD = 12.8$), was more diverse, with 55.8% of participants being African American and 11.5% being Latino/a, showing that the LGBIS can be used in diverse populations (Grant Smith et al., 2018). A different study which analyzed the LGBIS and its legitimacy as a LGBQ identity assessment tool found that even though certain subscales can vary in their effectiveness dependent upon the population diversity, specifically the LGBQ Identity Superiority subscale as shown on Table 1, the LGBIS is still a promising identity measurement tool (Cramer et al., 2017).

Table 1: LGBIS Subscales and Alphas			
LGBIS Subscale (Questions on LGBIS)	(Mohr & Kendra, 2011) Cronbach's Alpha	(Cramer et al., 2017) Cronbach's Alpha	Questions in Qualtrics Survey
Acceptance Concerns (5, 9, 16)	.82	.60	11, 15, 22
Concealment Motivation (1, 4, 19)	.72	.72	7, 10, 25
Identity Uncertainty (3, 8, 14, 22)	.93	.78	9, 14, 20, 28
Internalized Homonegativity (2, 20, 27)	.89	.72	8, 26, 33
Difficult Process (12, 17, <u>23</u>)	.86	.52	18, 23, <u>29</u>
Identity Affirmation (6, 13, 26)	.94	.64	13, 16, 24
Identity Centrality (<u>11</u> , 15, 21, 24, 25)	.84	.62	<u>17</u> , 21, 27, 30, 31
Identity Superiority (7, 10, 18)	.82	N/A	12, 19, 32

Subscale composition is as follows (underlined items should be reverse scored):

Acceptance Concerns (5, 9, 16), Concealment Motivation (1, 4, 19), Identity Uncertainty (3, 8, 14, 22), Internalized Homonegativity (2, 20, 27), Difficult Process (12, 17, 23), Identity Superiority (7, 10, 18), Identity Affirmation (6, 13, 26), and Identity Centrality (11, 15, 21, 24, 25)

E-Cigarette Dependence

To assess the e-cigarette dependence of the participants, the Penn State Electronic Cigarette Dependence Index (PS-ECDI) (Appendix C) was used. The PS-ECDI is a ten-item scale developed by Foulds et al. (2015) to be a tool that could easily assess e-cigarette dependence as well as cigarette dependence. The effectiveness of the PS-ECDI was tested by comparing the ten-item scale to the Cigarette Dependence Index, a similar ten-item scale that is effective in assessing cigarette dependence. The PS-ECDI was found to be an effective tool to be used to assess e-cigarette dependence, since the responses from Foulds et al. (2015) showed that participants who used e-cigarettes with zero nicotine were scored significantly lower on the PS-ECDI than participants who used e-cigarettes with 1-12 mg/ml of nicotine ($p < .001$). Those who used e-cigarettes with 1-12 mg/ml of nicotine also scored significantly lower on the PS-ECDI than those who used e-cigarettes with 13 mg/ml or higher of nicotine ($p < .001$) (Foulds et al., 2015). This measure was chosen for this study due to its status as a quality measure for e-cigarette dependence. Work done by Piper et al. (2020) showed that while the PS-ECDI did not have as high of internal consistency ($\text{Alpha} = .74$) as the Wisconsin Inventory of Smoking Dependence Motives (e-WISDM) ($\text{Alpha} = .81-.96$), the PS-ECDI is still a reliable assessment tool for e-cigarette dependence. Previous studies have used the PS-ECDI to assess dependence among JUUL users, finding that participants who reported ‘stealth vaping’ (hiding the use of their e-cigarette) had higher PS-ECDI scores than other participants ($p < .01$) as well as higher reported use days in the past 30 days ($p < .01$) (Yingst et al., 2021).

Other Tobacco use

A set of questions to assess what other tobacco products used by participants was included. (Appendix E: question 45). This was measured with the question: “Please indicate if

you have ever used any of the following tobacco products (even just one time) or in the past 30 days.” Response options are: “used in the past 30 days, had used but not in the past 30 days, or never used” for ten different tobacco products. To ensure e-cigarette dependence is accurately assessed, it will need to be known what other tobacco products are used by participants, since this can influence dependence scores (Foulds et al., 2015). Previous studies have shown a relationship between multiple tobacco products use and dependence (Loukas et al., 2016).

Data Management and Analysis

Data has remained protected and anonymous to ensure the privacy and safety of participants. Recorded responses remained on a limited number of devices to limit potential exposure of information to others to protect participants. Upon completion of data collection, the data was uploaded to IBM SPSS Statistics (Statistical Package for Social Sciences; Version 28.0.0) where it was cleaned for data analysis, which includes finding and removing extreme outliers, incomplete surveys, and any potential spam responses. Frequency tables were then created to have a brief overview of the data and to predict any potential issues with the regressions caused by low population numbers.

Afterwards, the reliability of the LGBIS and dependence scale was analyzed and the Pearson Correlation was calculated for each of the scales. Then, the scores of individual subscales of the LGBIS were analyzed with the dependence scores of participants using linear regression to assess the bivariate relationship between the two. Then another test controlling for the covariates of race/ethnicity, gender identity, sexual identity, age, education, and number of friends who vape was conducted.

Gender exclusions and recoding

Due to the low number of participants identifying as transgender, participants who identified as trans-women (N=1), and trans-men (N=4) were excluded from data analysis. Aside from the low numbers, excluding transgender participants from the data analysis as opposed to grouping them together with cis-gendered identifying participants or non-binary/gender nonconforming participants allows the researchers to not make assumptions about the unique experiences of trans people. This is done since the LGBIS assesses the identity of LGBQ people who have been stigmatized for having same-sex attractions and sexual experiences, as opposed to stigmatization from gender identity that trans people experience (Mohr et al., 2011).

There was also a low number of participants who identified as ‘gender nonconforming’ (N=5). Although the researchers recognize the complexities of gender identity and the uniqueness of nonbinary people and gender nonconforming people, previous research has shown these groups to have similarities of existing beyond the ‘binary’ genders of male and female (Fiani 2019). Previous research has described gender nonconforming identities existing as an identity akin to non-binary identities, while others lump all genders not outside of the binary as ‘Gender minorities’ (Guillory et al., 2020). Therefore, participants who identified as ‘gender nonconforming’ were recoded to be grouped with nonbinary participants.

Race / Ethnicity Exclusions and recoding

Participants who identified as Native Hawaiian (N=1), American Indian (N=4), and ‘not listed please describe race’ (N=6) were excluded from the study. These participants had too small a number of represented people in the study and would be below the recommended threshold of 10-15 observations needed per variable for regression analysis.

Education Recoding

Education groups were condensed due to low numbers of participants with less than high school education (N=6), master's degrees (N=1), and doctorates (N=2). If recoding was not done to these groups, these participants would have to be excluded from data analysis. Therefore, 'Less than high school' was recoded to be combined with 'high school degree.' 'Master's degree' and 'PhD or other Doctorate' were recoded to be combined with 'Bachelor's degree'.

The Pearson Correlation was used to calculate the relationship between the dependence scores and each of the LGBIS subscales. This was done to uncover any primary relationships between the LGBIS subscales and dependence before controlling for other variables.

Step 1 Univariate Relationship "Uncontrolled"

- Each subscale of the LGBIS will be ran with the dependence score. Then the total LGBIS score will be ran with the dependence score
- Regression analysis to compare the LGBIS subscale scores (Acceptance Concerns, Concealment Motivation, Identity Uncertainty, Internalized Homonegativity, Difficult Process, Identity Superiority, Identity Affirmation, and Identity Centrality) with Dependence Score PSECDI scores to answer the research questions of this project

Step 2 Controlled

- Control for gender, race/ethnicity, sexual identity, age, education, and number of friends who vape.
- Multiple linear regression will then be used to assess the relationship the LGBQ identity subscales, gender identity, race, and sexual identity (IVs) have with the e-cigarette dependence score (DV) of participants.

Table 2: Data analysis procedures		
Research Question	Data Analysis Procedures	Variable(s)
RQ 1: Is there a relationship between lesbian, gay, bisexual, and queer (LGBQ) identity and e-cigarette dependence in LGBQ young adults?	Pearson correlation; Multiple linear regression	LGBIS Subscales, Dependence Scale, Demographic variables
RQ 2: How does Internalized Homonegativity relate to e-cigarette dependence?	Pearson correlation; Multiple linear regression	LGBIS Subscale (internalized homonegativity), Dependence Scale, Demographic variables
RQ 3: How does LGBQ Identity Uncertainty relate to e-cigarette dependence?	Pearson correlation; Multiple linear regression	LGBIS Subscale (identity uncertainty), Dependence Scale, Demographic variables
RQ 4: How do LGBQ Identity Acceptance Concerns relate to e-cigarette dependence?	Pearson correlation; Multiple linear regression	LGBIS Subscale (internalized homonegativity), Dependence Scale, Demographic variables
RQ 5: How does LGBQ Identity Concealment Motivation relate to e-cigarette dependence?	Pearson correlation; Multiple linear regression	LGBIS Subscales (identity concealment) Dependence Scale, Demographic variables

Chapter 4:

Results

Introduction

The purpose of this study was to analyze the relationship between sexual identity and e-cigarette dependence. To screen participants and establish basic characteristics of this sample, a brief set of demographic questions were used to begin the survey. The following tables contain the demographic data for all participants, bivariate analysis, and the results of the regression analysis.

Participant Characteristics

Gender, Race, and Ethnicity.

Most participants were women and bisexual, with 156 out of 242 participants (64%) identifying as women and 145 participants (59%) identifying as bisexual, as seen in Table 3. Bisexual women were the largest subgroup, with 110

	Woman	Man	Non-binary	Gay	Lesbian	Bisexual	Queer
Woman N=156				0 (0.0%)	36 (23.1%)	110 (70.5%)	10 (6.4%)
Man N=55				21 (38.2%)	0 (0.0%)	26 (47.3%)	8 (14.5%)
Non-binary N=31				2 (6.5%)	5 (16.1%)	9 (29.0%)	15 (48.4%)
Race	Woman	Man	Non-binary	Gay	Lesbian	Bisexual	Queer
Asian N=17	11 (64.7%)	4 (23.5%)	2 (11.8%)	1 (5.9%)	5 (29.4%)	10 (58.8%)	1 (5.9%)
Black N=21	14 (66.7%)	6 (28.6%)	1 (4.8%)	3 (14.3%)	6 (28.6%)	9 (42.9%)	3 (14.3%)
White N=203	130 (64.3%)	45 (22.2%)	28 (13.8%)	19 (9.4%)	29 (14.3%)	126 (62.1%)	29 (14.3%)
Hispanic/Latinx	Woman	Man	Non-binary	Gay	Lesbian	Bisexual	Queer
Yes N=49	29 (59.2%)	15 (30.6%)	5 (10.2%)	4 (8.2%)	13 (26.5%)	27 (55.1%)	5 (10.2%)
No N=192	126 (65.6%)	40 (20.8%)	26 (13.5%)	19 (9.9%)	27 (14.1%)	118 (61.5%)	28 (14.6%)

participants (45%) identifying as bisexual women. The participants were also majority white (N=203) and non-Hispanic/LatinX (N=192).

Age

The participants varied in age, with 24-year-old (N=41) and 22-year-old (N=38) participants making up the largest individual groups, and the mean age of participants was 21.94 years old

(Table 4).

Due to the time this study took place, 139 participants (57.4%) were under 21 when COVID-19

Table 4. Participant Characteristics (n= 242) Age and Past 30-Day E-cigarette Use							
	Woman	Man	Non-binary	Gay	Lesbian	Bisexual	Queer
Age (M = 21.94; SD =2.05)							
18 N=12	8 (66.7%)	3 (25.0%)	1 (8.3%)	1 (8.3%)	2 (16.7%)	6 (50.0%)	3 (25.0%)
19 N=23	14 (60.9%)	5 (21.7%)	4 (17.4%)	2 (8.7%)	3 (13.0%)	13 (56.5%)	5 (21.7%)
20 N=32	21 (65.6%)	7 (21.9%)	4 (12.5%)	3 (9.4%)	4 (12.5%)	23 (71.9%)	2 (6.3%)
21 N=34	24 (70.6%)	5 (14.7%)	5 (14.7%)	2 (5.9%)	8 (23.5%)	20 (58.8%)	4 (11.8%)
22 N=38	26 (68.4%)	8 (21.1%)	4 (10.5%)	6 (15.8%)	6 (15.8%)	23 (60.5%)	3 (7.9%)
23 N=34	25 (73.5%)	4 (11.8%)	5 (14.7%)	1 (2.9%)	8 (23.5%)	21 (61.8%)	4 (11.8%)
24 N=41	29 (70.7%)	8 (19.5%)	4 (9.8%)	2 (4.9%)	7 (17.1%)	26 (63.4%)	6 (14.6%)
25 N=28	9 (32.1%)	15 (53.6%)	4 (14.3%)	6 (21.4%)	3 (10.7%)	13 (46.4%)	6 (21.4%)
M = Mean; SD = Standard Deviation							

came to the United States in 2020.

Employment and Education

Most participants had some form of employment, with most being employed full time (N=74). Furthermore, most participants were not students, with 78 participants stating that they were in school at the time (Part Time Student with

Table 5. Participant (n = 242) Employment Status and Education							
	Woman	Man	Non-binary	Gay	Lesbian	Bisexual	Queer
Employment							
Full Time N=74	54 (73.0%)	12 (16.2%)	8 (10.8%)	7 (9.5%)	11 (14.9%)	45 (60.8%)	11 (14.9%)
Part Time N=43	28 (65.1%)	12 (27.9%)	3 (7.0%)	4 (9.3%)	7 (16.3%)	27 (62.8%)	5 (11.6%)
Seeking Employment N=45	20 (44.4%)	15 (33.3%)	10 (22.2%)	5 (11.1%)	9 (20.0%)	27 (60.0%)	4 (8.9%)
Part Time Student with employment N=24	17 (70.8%)	5 (20.8%)	2 (8.3%)	2 (8.3%)	2 (8.3%)	19 (79.2%)	1 (4.2%)
Full Time Student – No employment N=54	36 (66.7%)	11 (20.4%)	7 (13.0%)	5 (9.3%)	10 (18.5%)	27 (50.0%)	12 (22.2%)
Education	Woman	Man	Non-binary	Gay	Lesbian	Bisexual	Queer
High School and lower N=120	76 (63.3%)	24 (20.0%)	20 (16.7%)	7 (5.8%)	15 (12.5%)	77 (64.2%)	21 (17.5%)
Associate degree N=56	33 (58.9%)	20 (35.7%)	3 (5.4%)	9 (16.1%)	12 (21.4%)	30 (53.6%)	5 (8.9%)
Bachelor's and above N=65	43 (70.8%)	11 (16.9%)	8 (12.3%)	7 (10.8%)	13 (20.0%)	35 (58.5%)	7 (10.8%)

employment N=24, Full Time Student – No employment N=54). Participants were equally distributed in education, with 120 participants having a high school education or lower and 111 having some college degree or more (Associate degree N=56, Bachelor's and above N=65).

Participant E-Cigarette Use

Past 30-day E-cigarette Use and Poly Tobacco Use

Past 30-day e-cigarette use	Woman	Man	Non-binary	Gay	Lesbian	Bisexual	Queer
1-5 Days N=15	9 (60.0%)	5 (33.3%)	1 (6.7%)	5 (33.3%)	5 (33.3%)	5 (33.3%)	0 (0%)
6-10 Days N=11	3 (27.3%)	7 (63.6%)	1 (6.7%)	3 (27.3%)	0 (0%)	6 (54.5%)	2 (18.2%)
11-15 Days N=7	6 (85.7%)	1 (14.3%)	0 (0%)	0 (0%)	2 (28.6%)	4 (57.1%)	1 (14.3%)
16-20 Days N=12	7 (58.3%)	2 (16.7%)	3 (25.0%)	1 (8.3%)	0 (0%)	7 (58.3%)	4 (33.3%)
21-25 Days N=16	8 (50.0%)	6 (37.5%)	2 (12.5%)	3 (18.8%)	4 (25.0%)	8 (50.0%)	1 (6.3%)
26-30 Days N=181	123 (68.0%)	34 (18.8%)	24 (13.3%)	11 (6.1%)	30 (16.6%)	115 (63.5%)	25 (13.8%)

Initial descriptive statistics showed that most of the participants were heavy users of their e-cigarettes, with 181 participants (75%) using them 26-30 days out of the past 30 days as shown in Table 6. Similar to the results shown in Table 3, women (N=123) and bisexuals (N=115) make up the largest groups of past 26–30-day e-cigarette users.

Most participants (63.1%) reported e-cigarettes as the only tobacco product they had used in the past 30-days. Participants who used one other tobacco product made up the second largest group, with 22.2% of participants having used another tobacco product besides e-cigarettes, as shown in Table 7.

Number of Other Products	n	Percent
0 (only e-cigs)	142	63.1%
1	50	22.2%
2	20	8.9%
3	6	2.7%
4	5	2.2%
5	1	.4%
7	1	.4%
Total	225	100%

Reliability Analysis

To measure internal consistency of the LGBIS subscales and the dependence score of participants, the Cronbach's alpha for each of the LGBIS subscales and the dependence scale were calculated. The reliability of the scales is shown in Table 10. The reliability of all the subscales of the LGBIS and the dependence scale were very reliable, with all the Cronbach's alphas being above .70 (acceptable Cronbach's Alpha scores are 0.6 to 0.7, scores from 0.7 to 0.9 are good, and anything over 0.9 is excellent). The highest reliability score came from Identity Affirmation (Cronbach's alpha = .906).

Table 11. Reliability of Scales for the LGBIS Subscales and Dependence Measure	
	Cronbach's Alpha
Concealment Motivation	.783
Acceptance Concerns	.801
Identity Uncertainty	.859
Internalized Homonegativity	.821
Difficult Process	.781
Identity Superiority	.859
Identity Affirmation	.906
Identity Centrality	.877
Dependence Score	.711

Dependence Index and LGBIS Subscale Results

Overall, the mean dependence score for participants was 11.29 (SD=4.88), indicating participants, on average, had medium dependence on e-cigarettes, bordering on high dependence (scores of 13+ indicate high dependence). Furthermore, five of the LGBIS subscale scores were between 2.6 and 3.47, around the middle mark for scoring (1-6), except for two, Internalized Homonegativity and Identity Affirmation. Internalized Homonegativity had a low mean score (M=1.91, SD=1.04), indicating that participants had low feelings of internalized homonegativity. Identity Affirmation scores were high (M=5.19, SD=.86), indicating that most participants felt pride in their LGBTQ Identity.

As shown in Table 9, non-Binary participants had the highest mean dependence score (M=12.4, SD=5.11) compared to male and female identifying participants. Furthermore, lesbian participants had the highest mean dependence scores of any sexual identity (M=12.15, SD=3.76). It should also be noted that participants who identified as queer had the highest variance in their dependence scores (M=11.73, SD=6.39). As for the LGBIS, Identity Affirmation scores were the highest, with non-binary participants (M=5.50, SD=0.89) and queer participants (M=5.66, SD=0.57) scoring the highest on average for gender and sexual identity subgroups, respectively. Participants who identified as women reported the lowest mean score for Internalized Homonegativity

	Mean	Std. Dev
Dependence Score	11.29	4.88
Concealment Motivation	3.47	1.29
Acceptance Concerns	3.37	1.29
Identity Uncertainty	2.60	1.22
Internalized Homonegativity	1.91	1.04
Difficult Process	3.41	1.32
Identity Superiority	2.83	1.43
Identity Affirmation	5.19	.86
Identity Centrality	3.86	1.150

(M=1.71, SD=0.83) of any represented gender. Participants who identified as lesbian

also had the lowest mean score for Internalized homonegativity (M=2.21, SD=1.05),

Table 9. Participant LGBIS and Dependence Scores for both gender and sexual identity							
	Woman	Man	Non-binary	Gay	Lesbian	Bisexual	Queer
Concealment Motivation	n=153 3.13 (1.23)	n=55 4.01 (1.27)	n=31 3.51 (1.27)	n=23 3.53 (1.35)	n=39 3.39 (1.22)	n=145 3.60 (1.31)	n=33 3.59 (1.46)
Acceptance Concerns	n=154 3.48 (1.31)	n=55 3.84 (1.21)	n=31 2.75 (1.14)	n=23 3.92 (1.39)	n=39 3.18 (1.23)	n=144 3.24 (1.23)	n=33 3.19 (1.24)
Identity Uncertainty	n=155 2.59 (1.24)	n=54 2.38 (1.12)	n=31 3.07 (1.26)	n=22 2.01 (.95)	n=40 2.21 (1.05)	n=145 2.70 (1.23)	n=33 3.05 (1.36)
Internalized Homonegativity	n=155 1.71 (0.83)	n=55 2.53 (1.34)	n=31 1.83 (1.06)	n=23 2.63 (1.27)	n=40 1.53 (0.69)	n=145 1.94 (1.06)	n=33 1.74 (0.92)
Difficult Process	n=155 3.31 (1.35)	n=55 3.61 (1.19)	n=31 3.55 (1.39)	n=23 3.07 (1.28)	n=40 3.32 (1.21)	n=145 3.43 (1.34)	n=33 3.67 (1.39)
Identity Superiority	n=154 2.63 (1.39)	n=55 3.27 (1.50)	n=31 3.13 (1.35)	n=23 3.77 (1.41)	n=40 3.44 (1.53)	n=144 2.39 (1.22)	n=33 3.43 (1.42)
Identity Affirmation	n=155 5.20 (0.83)	n=55 5.01 (0.89)	n=30 5.50 (0.89)	n=23 5.00 (0.97)	n=40 5.44 (0.58)	n=145 5.05 (0.91)	n=32 5.66 (0.57)
Identity Centrality	n=155 3.66 (1.11)	n=55 4.09 (1.12)	n=31 4.50 (1.13)	n=23 4.57 (0.98)	n=40 4.47 (1.01)	n=145 3.46 (1.06)	n=33 4.45 (1.02)
Dependence Score	n=153 11.42 (4.85)	n=54 10.3 (4.77)	n=30 12.4 (5.11)	n= 21 10.86 (4.16)	n= 40 12.15 (3.76)	n= 143 11.01 (4.88)	n= 33 11.73 (6.39)
M = Mean; (SD = Standard Deviation)							

Pearson Correlation

Initial correlation tests found that none of the LGBIS subscale scores had a statistically significant correlation with the dependence score, with all Pearson Correlation scores between dependence and the LGBIS subscales being below 0.1 (Table 10). Concealment Motivation, Internalized Homonegativity and Difficult Process were found to have significant correlations with every other subscale of the LGBIS.

	DS	CM	AC	IU	IH	DP	IS	IA	IC
Dependence Score (DS)	1.000								
Concealment Motivation (CM)	-.007	1							
Acceptance Concerns (AC)	.069	.498**	1						
Identity Uncertainty (IU)	.072	.271**	.221**	1					
Internalized Homonegativity (IH)	.006	.440**	.379**	.309**	1				
Difficult Process (DP)	-.032	.361**	.474**	.475**	.410**	1			
Identity Superiority (IS)	.098	-.222**	.082	-.055	-.164*	-.009	1		
Identity Affirmation (IA)	.063	-.373**	-.093	-.231**	-.563**	-.160*	.386**	1	
Identity Centrality (IC)	-.004	-.209**	.213**	-.116	-.243**	.064	.654**	.554**	1
Pearson Correlation (* = p<.05; ** = p<.001)									

Regression Analysis

LGBIS and Dependence - uncontrolled for demographics

The relationship between the LGBIS and dependence measure was tested using linear regression. The relationship was not statistically significant ($R^2 = 0.053$, $F(292.780, 5202.203) = 1.561$, $p = .138$). However, multiple linear regression analysis revealed that two LGBIS subscales were significantly associated with dependence scores, as shown in Table 12. It was found that Identity Superiority was significantly and positively associated with dependence ($\beta =$

0.185, $p = .037$). In addition, the results indicated that Identity Centrality was significantly and negatively associated with dependence ($\beta = -0.218$, $p = 0.036$). These findings address the research questions of what subscales of the LGBIS are associated with e-cigarette dependence without controlling for participant characteristics.

Table 12. Regression analysis of the Association between LGBIS Subscales and Dependence

LGBIS Subscale	Unstandardized Coefficients B	Standardized Coefficients Beta	<i>t</i>	<i>Sig.</i> <i>p</i> value
Acceptance Concerns	0.166	0.132	1.508	.133
Concealment Motivation	-0.27	-0.22	-.253	.800
Identity Uncertainty	0.104	0.106	1.382	.168
Internalized Homonegativity	0.101	0.064	.723	.471
Difficult Process	-0.151	-0.122	-1.445	.150
Identity Superiority	0.208	0.185	2.102	.037*
Identity Affirmation	0.300	0.157	1.671	.096
Identity Centrality	-0.182	-0.218	-2.115	.036*

Note. Numbers are standardized beta coefficients. * $p < .05$.

Table 13. Regression analysis testing the association of LGBIS subscales and Dependence Controlling for Participant Characteristics				
	Unstandardized Coefficients B	Standardized Coefficients Beta (β)	<i>t</i>	<i>p</i> value
Acceptance Concerns	0.21	0.169	1.801	0.073
Concealment Motivation	-0.011	-0.009	-0.099	0.921
Identity Uncertainty	0.081	0.083	0.998	0.319
Internalized Homonegativity	0.172	0.111	1.109	0.269
Difficult Process	-0.115	-0.094	-1.064	0.289
Identity Superiority	0.255	0.227	2.406	.017*
Identity Affirmation	0.29	0.152	1.566	0.119
Identity Centrality	-0.268	-0.32	-2.863	.005**
Age	0.372	0.154	2.004	.046*
Gender (reference: Male)				
Female	2.319	0.229	2.172	.031*
Non-Binary	0.726	0.254	2.671	.008*
Sexuality (reference Bisexual)				
Gay	-0.324	-0.052	-0.427	0.67
Lesbian	0.119	0.026	0.292	0.77
Queer	0.019	0.007	0.067	0.947
Race (reference: White)				
Black or African American	0.409	0.073	0.857	0.392
Asian	1.067	0.177	2.093	.038*
Hispanic or Latinx	1.047	0.081	1.088	0.278
Poly Use	0.432	0.09	1.277	0.203
Education	-0.034	-0.003	-0.044	0.965
Having Close Friends who Use				
E-cigarettes	0.487	0.126	1.788	0.075

Note. Numbers are standardized beta coefficients. * $p < .05$, ** $p < .01$, *** $p < .001$.

Multiple linear regression was used to test if the LGBIS Subscales were significantly related to e-cigarette dependence when controlled for participant characteristics. The overall regression analysis was statistically significant ($R^2 = 0.148$, $F(756.429, 4350.101) = 1.687$, $p = .038$). The results showed that Identity Superiority was significantly and positively associated with dependence ($\beta = .227$, $p = .017$). Additionally, Identity Centrality was significantly and negatively associated with dependence ($\beta = -.320$, $p = .005$). These findings were in line with the

uncontrolled regression analysis, reinforcing the relationship Identity Superiority and Identity Centrality have with dependence.

Regarding participant characteristics, age was significantly and positively associated with dependence ($\beta = .154, p = .046$). Furthermore, it was observed that identifying as female was significantly and positively associated with dependence ($\beta = .229, p = .031$), compared to identifying as male. Identifying as non-binary was significantly and positively be associated with dependence ($\beta = .254, p = .008$), compared to identifying as male. Lastly, it was found that identifying as Asian was significantly and positively associated with dependence ($\beta = .177, p = .038$), compared to identifying as white.

Table 14. Regression analysis of LGBIS predicting 30-day e-cigarette use (Controlling for Participant Characteristics)

	Unstandardized Coefficients B	Standardized Coefficients Beta (β)	<i>t</i>	<i>p</i> value
Acceptance Concerns	0.043	0.113	1.23	0.22
Concealment Motivation	-0.032	-0.084	-0.941	0.348
Identity Uncertainty	0.017	0.059	0.727	0.468
Internalized Homonegativity	0.02	0.042	0.429	0.668
Difficult Process	-0.042	-0.112	-1.322	0.188
Identity Superiority	0.053	0.154	1.685	0.093
Identity Affirmation	0.028	0.047	0.504	0.615
Identity Centrality	-0.034	-0.133	-1.223	0.223
Age	0.065	0.088	1.172	0.243
Gender (reference: Male)				
Female	0.079	0.026	0.255	0.799
Non-Binary	0.065	0.075	0.822	0.412
Sexuality (reference Bisexual)				
Gay	0.596	0.315	2.767	.006**
Lesbian	0.089	0.064	0.759	0.449
Queer	-0.173	-0.202	-2.015	.045*
Race (reference: White)				
Black or African American	0.16	0.089	1.065	0.288
Asian	0.088	0.051	0.615	0.539
Hispanic or Latinx	0.596	0.153	2.13	.034*
Poly Use	-0.371	-0.251	-3.671	<.001***
Education	-0.048	-0.016	-0.208	0.835
Having Close Friends who Use E-cigarettes	0.173	0.147	2.149	.033*

Note. Numbers are standardized beta coefficients. * $p < .05$, ** $p < .01$, *** $p < .001$.

Multiple linear regression was used to test if the LGBIS Subscales were significantly related to past 30-day e-cigarette use when controlling for age, gender, sexuality, race. Latinx identity, poly use, education, and close friend e-cigarette use. The overall regression was statistically significant ($R^2 = 0.179$, $F(86.868, 399.580) = 2.152$, $p = .004$). However, the analysis showed that no single LGBIS subscale was significantly related to past 30-day use.

Instead, there were five predictors that were significantly related to past 30-day use. Identifying as gay ($\beta = .315, p = .006$) or queer ($\beta = -.202, p = .045$) was significantly associated with past 30-day use in comparison to bisexual identity. Furthermore, identifying as Hispanic or Latinx was significantly associated with past 30-day use ($\beta = .153, p = <.034$). Additionally, having close friends who also used e-cigarettes was significantly associated with past 30-day use ($\beta = .147, p = .033$). The strongest significant relationship with past 30-day use was participants using multiple nicotine products, i.e., poly use ($\beta = -.251, p = <.001$).

Chapter 5

Discussion

While there has been ample research looking at young adult e-cigarette use, LGBTQ e-cigarette use, and LGBTQ Identity, the literature fails to investigate how LGBTQ identity is associated with e-cigarette dependence in LGBTQ young adults. This study explores this relationship by examining the association between LGBTQ identity (via LGBIS subscales) and dependence among a sample of LGBTQ young adults. It was found that there was a significant relationship between two subscales of the LGBIS and e-cigarette dependence, with Identity Superiority and Identity Centrality being significantly associated with dependence. However, these significant findings only occurred after controlling for the other LGBIS subscales in the regression analysis, as Pearson Correlation analysis showed no significant associations between the LGBIS subscales and dependence. In addition, there were several significant demographic variables that were identified to be associated with dependence. This chapter will discuss the findings of this study, the limitations of the research, and recommendations for any future work.

The largest groups represented in the current study for gender were women and for sexuality were bisexual people, with the largest subgroup being bisexual women, a constant with the literature that showed that sexual minority women were the most likely to use e-cigarettes and were more likely to respond to surveys (Matthews et al., 2017; Mulder, J. a. d. B. M., 2019). The mean age of participants was 21.94, meaning that most participants were younger than 21 years old when COVID came to the United States, meaning their experiences as young adults occurred primarily during the COVID-19 pandemic. This generation of LGBTQ e-cigarette users will present a new set of challenges in understanding health behavior due to their unique experiences as young adults in a pandemic. Whereas previous tobacco research identified LGBTQ spaces like

clubs and bars as places where tobacco use was frequent, the current sample was not able to immediately access these spaces (Guillory et al., 2018). This might explain why the current study's findings differ from prior research.

Research Question 1: Relationship Between the LGBIS and Dependence

The uncontrolled regression analysis showed that both Identity Superiority and Identity Centrality were significantly associated with dependence. Previous studies show that Identity Superiority is related to avoidance of heterosexual people and was positively associated with Identity Centrality (Grant Smith et al. 2017). The Pearson Correlations supported the association between these two subscales, as they were significantly and positively correlated with one another. However, these two differed in their association with dependence, with Identity Superiority having a positive association and Identity Centrality having a negative association. Identity Superiority's positive and significant association with dependence supports the previous literature that shows LGBQ vaping is influenced by one's relationship with the LGBQ community (Bennett et al 2014; Jannat-Khah et al., 2018)

In regression analysis controlling for participant characteristics, Identity Superiority and Identity Centrality were associated with dependence. These findings differ from a previous study which found that LGBQ Identity Affirmation was a predictor of primary dependence motives. (Grant Smith et al., 2018). Primary dependence motives are the loss of autonomy of smoking, craving, loss of control, and tolerance – many of the same signs of depression assessed in the Penn State Electronic Cigarette Dependence Index. Where the current results differ to the previous work relating the LGBIS to cigarette dependence is that the previous study found that LGBQ Identity Uncertainty was a predictor of secondary dependence motives, which was not found to be significant in the current results (Grant Smith et al., 2018). Secondary dependence

motives are the social/environmental urges to smoke. This difference may be attributed to the populations studied. In the previous study, the average age of the participants was 42.8 years old, a large age difference from the current research (Grant Smith et al., 2018). Furthermore, the previous study only had 52 participants, not enough to reach statistical power considering the length of their survey.

The controlled regression analysis also showed that age was positively and significantly associated with dependence. Due to the Tobacco 21 legislation, this result could be related to the ease of access to tobacco that participants experience as they get older. It was also found that identifying as female was significantly and positively associated with dependence, which is consistent with the literature stating that sexual minority women were the most susceptible to tobacco use (Emory et al., 2016). Results also found that identifying as non-binary was significantly and positively associated with dependence. Literature about non-binary dependence is limited, but research on tobacco use found that non-binary participants smoked less cigarettes per day than transgender and cisgender participants (Vogel et al., 2019).

Research Question 2: Relationship between Individual LGBIS Subscales and Dependence

Subscales Assessing Outside Factors

Acceptance Concerns and Concealment Motivation are the two subscales centered on the effects of ‘coming out’ for participants. Acceptance Concerns is assessing the participant concern with potential stigmatization due to their sexual identity. Concealment Motivation assesses the participant motivation to protect or ‘conceal’ their identity as an LGBQ person. Two of the primary research questions for this project asked how these two subscales were associated with dependence. This focus was due to the stress associated with these subscales. Having to

conceal one's identity out of fear of stigma can lead to coping mechanisms, such as tobacco use, especially among LGBQ people who regularly experience discrimination (Casey et al., 2019). Furthermore, with violence against LGBQ people being common, identity concealment would naturally occur among LGBQ people (Bender & Lauritsen, 2020). However, in the current study, these two subscales were not significantly associated with nicotine dependence, indicating that among the young adult population, these concerns, while present, are not associated with dependence.

Subscales Assessing Internal Struggle

Difficult Process, Identity Uncertainty, and Internalized Homonegativity are the three subscales of the LGBIS that focus on the internal struggle towards self-acceptance that LGBQ people face. Difficult Process measures the perception that one's LGBQ identity development process was difficult, Internalized Homonegativity assesses the rejection of an individual's own LGBQ identity, and Identity Uncertainty assesses one's uncertainty about their sexual orientation. None of these subscales was significantly associated with dependence. However, while previous research found that LGBQ Identity Uncertainty was a predictor of secondary dependence motives such as the desire for the taste of cigarettes and the social stimulus of smoking, that study had a much older population (Grant Smith et al., 2018).

Subscales Assessing Positive Feelings Towards Identity

The Identity Superiority subscale measures participants views favoring LGBQ people over heterosexual people. Identity Superiority was found in both controlled and uncontrolled regression analysis to be significantly and positively associated with dependence. Identity Centrality is the subscale that assesses the participant's view of their LGBQ identity as significant and important to their overall identity. Identity Centrality was found in both

controlled and uncontrolled regression analysis to be significantly and negatively associated with dependence. However, Identity Affirmation, the subscale that assesses pride in one's sexual identity, was not significantly associated with dependence. This is counter to previous research which found Identity Affirmation was associated with primary dependence motives, such as the loss of control over their smoking habits and the strong cravings to smoke, among LGBQ people (Grant Smith et al., 2018). The scores for Identity Affirmation were at the ceiling of the subscale, potentially impacting the results due to the low variance of scores. Furthermore, when the LGBIS was developed, Identity Centrality was found to positively and significantly be associated with Identity Affirmation. This calls for future research to assess whether every positive LGBQ subscale is associated with dependence, or if the current findings correctly assess which subscales of the LGBIS have an association with dependence. The current results may have been impacted by a suppressor effect, where the LGBIS subscales had such strong relationships with one another that they changed the reported associations with dependence. Future research can control for this by running factor analysis on the individual LGBIS subscales and replacing each subscale with their factor scores in a second regression analysis. This would control for the potential suppression effect and provide results with associations that may have greater statistical accuracy. Overall, the findings between this study and the work done by Grant Smith et al., (2018) contrast the original findings of the LGBIS, which showed that positive assessment concerning one's sexual identity were related to positive health outcomes (Mohr et al., 2011). This may be attributed to the difference between previous LGBQ research assessing health outcomes related to nicotine and tobacco use and not dependence.

Dependence vs Use

While this project focuses on the relationship between dependence and LGBTQ identity, e-cigarette use was also assessed and analyzed to ensure there was a comparison of dependence and use. Dependence differs from use in many ways. Dependence refers to the physiological adaptations that occur in the central nervous system as it is affected by medications, causing a rebound effect when the medication is discontinued (O'Brien, 2011). In the case of e-cigarettes, nicotine enters the body through the lungs when inhaled, moving rapidly to the brain, causing the user to feel pleasure and stress relief, the primary effects of nicotine (Benowitz, 2010; U.S. Department of Health and Human Services, 2016). With continued exposure, tolerance develops, reducing primary use effects, and inducing physical dependence (Benowitz, 2010). Dependence is measured by accounting for how long it takes an individual to use an e-cigarette after waking, how regularly they vape, and if they experience withdrawal symptoms such as irritability and restlessness (Benowitz, 2010; Foulds et al., 2015; O'Brien, 2011; U.S. Department of Health and Human Services, 2016). As e-cigarettes have the potential to introduce even more nicotine to users than combustible cigarettes, focusing on dependence rather than use was key to understanding the health behaviors of LGBTQ young adults (Talih et al., 2019; U.S. Department of Health and Human Services, 2016).

Regression analysis found that no LGBIS subscales were significantly associated with past 30-day use, despite there being an association with LGBIS subscales and dependence. This supports the call for more LGBTQ nicotine and tobacco research to be centered on dependence and not use. The need for dependence research to focus on e-cigarettes rather than traditional cigarettes is supported by previous research reporting that e-cigarettes can introduce more nicotine to users than traditional cigarettes which has been found to put young adults at risk for

dependence (Dawkins et al., 2016; Talih et al., 2019; U.S. Department of Health and Human Services, 2016). The findings of the current research also indicate that future cessation interventions should target the relationship dependence has with identity to positively change tobacco use behaviors.

There were a few participant characteristics that were significantly associated with past 30-day use. Consistent with the literature, it was found that participants who had close friends who used e-cigarettes were more likely to have higher reported past 30-day use – adding to the literature supporting the social nature of LGBQ tobacco use being a socially driven health behavior (Bennett et al 2014; Jannat-Khah et al., 2018). The same was found for participants who identified as gay and for participants who were Hispanic or LatinX. While it was surprising to find that using multiple tobacco products was significantly and negatively associated with past 30-day e-cigarette use, it does make sense considering these participants may address their nicotine dependence with other products or that their products contained higher concentrations of nicotine, indicating their lower past 30-day use of e-cigarettes while maintaining dependence.

Limitations

This study centered on dependence and the LGBQ identity in one sample of 18–25-year-old people, and so generalizations should not be made for other populations. The study design was cross-sectional, and occurred during a certain period, so the associations found between variables cannot be assumed to be causal relationships. The results of the regression analysis may have also been influenced by the suppression effect of the LGBIS subscales. Since the LGBIS subscales were found in Pearson Correlation analysis to have multiple significant correlations with one another, these correlations may have influenced the findings in the regression analysis, potentially influencing what subscales were significantly associated with

dependence. Future studies using this can control for this issue by using the factor scores of the different subscales to replace the subscale scores in regression analysis or by combining the subscales into variables. The issue with combining variables in the current study is that by combining subscales, the focus of the study itself is lost. When considering the complexity of LGBQ identity, further limiting what aspects of identity are associated with dependence makes the findings of this study less impactful for future interventions and research. Therefore, future work with this dataset will use factor scores to replace variable to keep each subscale separate and allow the results to reveal what each subscale is associated with dependence while controlling for suppressors.

This project did not have enough participants who identified as trans male or trans female, and therefore was unable to assess the relationship between LGBQ identity and dependence among trans young adults. Having more transgender participants in future studies would be beneficial to understanding the experience of LGBQ trans people and their health behavior. The same can be said for participants who identified as Native Hawaiian and American Indian, as the study did not have enough participants to include them in data analysis.

Recommendations for Future Studies

Future studies should expand upon the relationship between positive feelings of one's LGBQ identity and dependence among young adults. Testing more diverse groups and larger groups may lead to different findings than the current study. Furthermore, the age group studied in this project was of interest because they provide information about the future of tobacco use among queer people. Previous research indicated that initial tobacco use was associated with gay bar scenes and culture. Due to this study taking place during the COVID-19 pandemic and the participants being as young as they were, they would not have experienced bars and clubs before

the pandemic (139 participants [57.4% of participants] were under 21 when COVID came to the US). This study is among the first studies to record these behaviors in a group that was not able to experience these formative events that were a significant part of previous queer tobacco research. Future strategies for tobacco cessation and prevention targeting sexual minority young adults will need to focus on the wholistic experience of this population and not just on their sexual identities.

Implications for Practice

Practitioners should use the findings of this research to build upon and improve the work of campaigns that address tobacco use in LGBQ young adults. Campaigns such as the FDA's *This Free Life*, a public education campaign intended to reduce tobacco use among LGBT young adults who occasionally use tobacco, have had limited success in changing the beliefs involving the social aspects of smoking (Crankshaw et al., 2022). The described goal of *This Free Life* was to challenge the perception that tobacco use is essential to LGBT, essentially challenging the relationship between tobacco use and Identity Centrality. The current study found that Identity Centrality had an inverse relationship with e-cigarette dependence, the tobacco product of choice for LGBQ young adults. Therefore, based off the findings of this study, future anti-tobacco campaigns should focus on Identity Superiority when attempting to change the health behaviors of LGBQ young adults. This way, the social aspect of LGBQ tobacco use is at the forefront of any intervention, as Identity Superiority has been found to be negatively associated with the degree of interest in interacting with heterosexuals, preferring interaction with other LGBQ people (Mohr et al., 2011). Interventions focused on the preservation of LGBQ lives by highlighting the importance of having LGBQ elders in the community as a motive for tobacco cessation may be an effective way to highlight Identity Superiority and its relationship with

dependence. This way, interventions focus on the importance of the LGBQ community and their health, without making the individuals own LGBQ identity the only aspect of their identity being acknowledged – which coincides with the findings of the current study suggesting that high feelings of LGBQ Identity Centrality are not associated dependence. To reach the LGBQ young adult population in the United States and improve tobacco related health outcomes, messaging and delivery of campaigns and interventions must be improved, by implementing pro-LGBQ Identity Superiority alongside tobacco messaging.

Conclusions/Discussion

While LGBQ cigarette use is noted in the literature, the understanding of LGBQ e-cigarette dependence has still yet to be fully understood. Future interventions aiming to address the high e-cigarette use rates among young adults must factor in the experiences and health needs of sexual minorities, one of the most vulnerable populations regarding tobacco use. To better understand the findings of the current study, viewing the LGBIS subscales through a Ecological Model can help understand the influence each subscale has on health behavior, specifically in relation to intrapersonal, interpersonal, and community factors. Intrapersonal factors are what influence health behavior based off an individual’s own attitudes, beliefs, and knowledge – which the Identity Centrality subscale assesses. Identity Superiority, the subscale assessing the participants feelings preferring LGBQ people over heterosexual people, can be framed through all three aforementioned factors. It can be considered an interpersonal factor because it is an individual’s own belief and preference of preferring LGBQ people to heterosexual people. It has an influence as an interpersonal factor (interaction with others) since it has been found to be associated with the avoidance of heterosexual people. Lastly, Identity Superiority can be considered a community factor (formal or informal social norms that exist among groups) since LGBQ

tobacco use has been shown to be a socially influenced health behavior. Using ecological models to understand the LGBIS subscales influence on health behavior will aid in attempts to promote positive health behavior changes among LGBQ young adults regarding e-cigarette use.

The findings in this study that demonstrate a positive association between Identity Superiority and dependence, as well as a positive association between the number of five closest friends who vape with past 30-day e-cigarette use, support the idea of LGBQ tobacco use being a socially driven health behavior (Bennett et al 2014; Jannat-Khah et al., 2018). This may relate to the Social Categorization (the method through which we group individuals based on social information) of LGBQ young adults to view e-cigarette and tobacco use as a part of LGBQ identity (Canales, G., & Lopez, S. A., 2013; Stolier, R. M., & Freeman, J. B., 2016). Specifically, that their identity as a LGBQ person influences their view of tobacco use as an assumed part of queer culture. While there is no universal 'queer experience' understanding the commonality of queer people's identities and how they may be associated with nicotine dependence is critical in helping prevent long term negative health outcomes for queer people. LGBQ people experience a myriad of negative health outcomes related to their identity; an avoidable negative health behavior like nicotine addiction does not need to be another.

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Appendix A: Recruitment Organizations/Businesses

Bisexual Resource Center	http://biresource.org/
Campus Pride	Campuspride.org
Centerlink	lgbtcenters.org
GLAAD	https://www.glaad.org/about
GLMA (health professionals advancing LGBTQ equality)	GLMA.org
NCLR	nclrights.org
National LGBTQ task force	thetaskforce.org
Gay Straight Alliance (local chapters)	https://gsanetwork.org/
Freedom Oklahoma	https://www.freedomoklahoma.org/
Diversity Center of Oklahoma	http://diversitycenterofoklahoma.org/
Oklahomans for equality (OKEQ)	http://www.okeq.org/
Equality Kansas	https://eqks.org/
Equality Texas (EQTX)	https://www.equalitytexas.org/
Pieces bar	https://www.piecesbar.com/
STONEWALL INN	https://thestonewallinnnyc.com/
Monster bar NYC	http://www.monsterbarnyc.com/
Flaming saddles NYC	https://www.flamingsaddles.com/nyc
House of Yes	https://houseofyes.org/
Marquee New York	https://taogroup.com/venues/marquee-new-york/
Industry Bar	https://www.industry-bar.com/
Slate NY	https://slate-ny.com/
Big Chicks + Tweet	https://www.bigchicks.com/
Charlies Chicago	https://www.charlieschicago.com/

the closet bar, Chicago	http://theclosetchicago.com/
Hydrate	https://hydratechicago.com/
Lucky horse shoe	https://luckyhorseshoelounge.com/
north end	https://northendchicago.com/
Replay Beer and Bourbon	https://www.replaylakeview.com/#welcome
La Cueva Night Club	https://www.facebook.com/La-Cueva-Night-Club-796111993787698/
Rogers Park Social	http://www.rogersparksocial.com/
Roscoes	https://roscoes.com/
Sidetrack	https://www.sidetrackchicago.com/
the SOFO tap	https://thesofotap.com/
DS tequila	https://dstequila.com/
R Public House	https://rpublichouse.com/
Queen! at Smart Bar- Sundays	https://www.facebook.com/QueenSundays/
Big Jones	https://bigjoneschicago.com/contact-us/
Cowboys and Astronauts	https://cowboysandastronauts.com/
Asrai Garden	https://www.asraigarden.com/
Cram Fashion	https://www.cramfashion.com/
Four-sided	https://foursided.com/
Unabridged Bookstore	https://www.unabridgedbookstore.com/
wood Chicago	http://woodchicago.com/
angler fish lighting	https://www.anglerfishlighting.com/
Howard Brown	https://howardbrown.org/contact-us/#gf_4
Dapper and Urban	https://www.dapperandurban.com/
early 2 bed	https://www.early2bed.com/
Gnat	https://gnat.shop/
Humboldt house co	https://humboldthouseco.com/

Jameson Loves Danger	https://shop.jamesonlovesdanger.com/products/shop/
Knee deep vintage	https://www.kneedeepvintage.com/
Provoke culture	https://www.provokeculture.com/
Reformed School Shop	www.Reformed-School.com
Shirts Illustrated	http://www.shirtsillustrated.com/
Women & Children First	https://www.womenandchildrenfirst.com/
Vintuition fashion	https://www.facebook.com/Vintuition/
OUT VOICES	https://phoenix.outvoices.us/
PHX PRIDE	https://phoenixpride.org/
pride guide AZ	https://gayarizona.com/
varsity project	https://www.thevarsityproject.com/
Phoenix gay men's chorus	https://phxgmc.org/
Southwest center	https://www.swcenter.org/
<u>PFLAG Chapter Name</u>	Email
PFLAG Anchorage/South Central AK	pflagshoals@gmail.com
PFLAG Fairbanks	pflag.huntsville@gmail.com
PFLAG Juneau	scleveland@cabanissmobile.com
PFLAG Auburn	carolechomicz@gmail.com
PFLAG Birmingham	pflagmontgomery@gmail.com
PFLAG Dothan	pflagtuscaloosa@gmail.com
PFLAG Florence/Shoals	pflagnwa@gmail.com
PFLAG Huntsville	info@pflagphoenix.org
PFLAG Mobile	nativepflag@gmail.com
PFLAG Montevallo	pflagedona@gmail.com
PFLAG Montgomery	info@pflagsierravista.org
PFLAG Tuscaloosa	pflagtuc@pflagtucson.org

PFLAG Fayetteville/North west Arkansas	kenweathersby@hotmail.com
PFLAG Phoenix	pflagbfl@yahoo.com
PFLAG Phoenix Native American	rlg.reynolds@gmail.com
PFLAG Sedona/Verde Valley	info@pflagclaremont.com
PFLAG Sierra Vista	claycordpflag@gmail.com
PFLAG Tucson	srvpflag@gmail.com
PFLAG Yuma	pflagfresno@gmail.com
PFLAG Bakersfield	pflag@pflagnevco.com
PFLAG Burbank	information@pflagplacercou nty.org
PFLAG Claremont	pflaglb@yahoo.com
PFLAG Clayton / Concord	president@pflagla.org
PFLAG Danville/San Ramon Valley	info@pflagmanhattanbeach.o rg
PFLAG Fresno	
PFLAG Grass Valley/Nevada City	info@pflagnapa.org
PFLAG Greater Placer County	pflagnewportbeach@gmail.c om
PFLAG Long Beach	pflag@tcote.org
PFLAG Los Angeles	pflagoeb@gmail.com
PFLAG Manhattan Beach / South Bay	brendathompsonpflag@gmai l.com
PFLAG Moraga	info@pspflag.org
PFLAG Napa	info@pflagpasadena.org
PFLAG Newport Beach	pflagplacerville@gmail.org
PFLAG Oak Park/Conejo Valley	pflag_riversideca@yahoo.co m
PFLAG Oakland/East Bay	pflagsacramento@gmail.com
PFLAG Orange County	info@pflag.com

PFLAG Palm Springs/Desert Communities	pflagsf@gmail.com
PFLAG Pasadena	sgvapipflag@gmail.com
PFLAG Placerville/El Dorado County	info@pflagsanjose.org
PFLAG Riverside	pflagsantabarbara@gmail.com
PFLAG Sacramento	info@pflagscv.net
PFLAG San Diego	pflagsgcc@gmail.com
PFLAG San Francisco	pflag.santarosa@gmail.com
PFLAG San Gabriel Valley/API	pflagsouthoc@gmail.com
PFLAG San Jose/Peninsula	info@pflagtemecula.org
PFLAG Santa Barbara	info@pflagtrivalley.com
PFLAG Santa Clarita	info@pflag-tulare-kings.org
PFLAG Santa Cruz County	deedle345@gmail.com
PFLAG Santa Rosa	pflag.ventura.ca@gmail.com
PFLAG South Orange County/Laguna Hills	info@pflagboulder.org
PFLAG Temecula	info@pflagbroomfield.org
PFLAG Tri Valley	information@cspflag.org
PFLAG Tulare-Kings Counties	pflagden@gmail.com
PFLAG Ukiah	pflag.noco@gmail.com
PFLAG Ventura	pflaggreeley@gmail.com
PFLAG Boulder	info@pflaghighlandsranch.org
PFLAG Broomfield	info@pflaghartford.org
PFLAG Colorado Springs	pflagnorwalk@gmail.com
PFLAG Denver	pflagsect@snet.net

PFLAG Fort Collins/Northern Colorado	pflagwaterbury@gmail.com
PFLAG Greeley	info@pflagdc.org
PFLAG Highlands Ranch South Suburban	pflagmiddletowndelaware@gmail.com
PFLAG Hartford	pflagrehobothbeach@gmail.com
PFLAG Norwalk	pflagwilmde@att.net
PFLAG Southeastern CT	info@pflagdunedin.org
PFLAG Waterbury	pflagfortmyers2@aol.com
PFLAG Washington DC / Metropolitan Area	pflagbroward@gmail.com
PFLAG Middletown	info@pflaggainesville.org
PFLAG Rehoboth Beach	info@pflagjax.org
PFLAG Wilmington/ North Delaware	pflagladylake@gmail.com
PFLAG Dunedin	polkpflag@gmail.com
PFLAG Fort Myers	pflag.msc@gmail.com
PFLAG Ft. Lauderdale	info@pflagnaples.org
PFLAG Gainesville	pflagnewsmyrnabeach@live.com
PFLAG Jacksonville	
PFLAG Lady Lake	info@pflagorlando.org
PFLAG Lakeland/Polk County	info@pflagpbc.net
PFLAG Melbourne	pflagriverviewfamily@gmail.com
PFLAG Naples	pflagsarasota@gmail.com
PFLAG New Smyrna Beach/Volusia	southmiamipflag@gmail.com
PFLAG Niceville	pflag.st.pete@gmail.com
PFLAG Orlando	pflagstuartfl@gmail.com

PFLAG Palm Beach	info@pflag-tallahassee.org
PFLAG Riverview	pflag.tampa@gmail.com
PFLAG Sarasota	pflagwesleychapel@gmail.com
PFLAG South Miami	pflagathensarea@gmail.com
PFLAG St. Petersburg	info@pflagatl.org
PFLAG Stuart	info@pflagblairsville.org
PFLAG Tallahassee	pflagjohnscreek@gmail.com
PFLAG Tampa	mariettapflag@gmail.com
PFLAG Wesley Chapel / Pasco	ptcpflag@gmail.com
PFLAG Athens Area	pflagsandysprings@gmail.com
PFLAG Atlanta	pflagwoodstock@gmail.com
PFLAG Blairsville	pflagkonabigisland@gmail.com
PFLAG Johns Creek	pflagames@yahoo.com
PFLAG Marietta	pflagcr@gmail.com
PFLAG Peachtree City	pflagdsm@gmail.com
PFLAG Sandy Springs	pflagfd@gmail.com
PFLAG Woodstock	pflagmountpleasant@gmail.com
PFLAG Kona/Big Island	pflagoskaloosa@gmail.com
PFLAG Ames	goodwin.mk@gmail.com
PFLAG Cedar Rapids	luz_id@yahoo.com
PFLAG Des Moines	pflagid@aol.com
PFLAG Fort Dodge	pflagmoscow@gmail.com
PFLAG Mount Pleasant	pflagsandpointid@gmail.com
PFLAG Oskaloosa	pflagaurorafoxvalley@pflagillinois.org
PFLAG Siouxland	bellevilleilpflag@outlook.com

PFLAG Boise/Treasure Valley	info@pflagbn.com
PFLAG Idaho Falls	pflagbolingbrook@gmail.com
PFLAG Sandpoint	pflagchicagometro@pflagillinois.org
PFLAG Belleville	pflagdeerfield@pflagillinois.org
PFLAG Bloomington/Normal	pflagdupage@pflagillinois.org
PFLAG Bolingbrook	galesburgpflag@gmail.com
PFLAG Charleston	pflag.grayslake.roundlake@gmail.com
PFLAG Chicago Metro	hannibalquincypflag@gmail.com
PFLAG Decatur	pflaghinsdale@pflagillinois.org
PFLAG Deerfield	pflag.hgl@gmail.com
PFLAG Dupage	pflagkankakee@pflagillinois.org
PFLAG Galesburg	pflagmchenry@pflagillinois.org
PFLAG Grayslake / Round Lake	pflagoaklawn@pflagillinois.org
PFLAG Hannibal/Quincy	pflagoakpark@pflagillinois.org
PFLAG Hinsdale	pflagottawa@pflagillinois.org
PFLAG Homer Glen/Lockport	pflagpeoria@gmail.com
PFLAG Kankakee	pflagrockfordchapter@gmail.com
PFLAG McHenry	pflagsaukvalley@gmail.com
PFLAG Oak Lawn	uurevmartin@gmail.com
PFLAG Oak Park Area	pflagtinleypark@gmail.com
PFLAG Ottawa	btownpflag@gmail.com
PFLAG Peoria	info@pflagcp-nwi.org
PFLAG Rockford	pflagfishers@gmail.com
PFLAG Sauk Valley	pflagfortwayne@gmail.com
PFLAG Springfield	pflaggreenwood@gmail.com

PFLAG Tinley Park	pflag.hanover@gmail.com
PFLAG Bloomington	info@indypflag.org
PFLAG Crown Point	msmeredithrichmond@gmail.com
PFLAG Fishers	mcpflag@gmail.com
PFLAG Fort Wayne	pflagmichiana@gmail.com
PFLAG Greenwood	valpopflag463@gmail.com
PFLAG Hanover	wrvpflag@gmail.com
PFLAG Indianapolis	pflaghutch@gmail.com
PFLAG Lafayette/Tippecanoe County	pflagkc@pflagkc.org
PFLAG Michigan City	sffeist@msn.com
PFLAG South Bend/Michiana	info@pflagcentralky.org
PFLAG Valparaiso	info@pflaglouisville.org
PFLAG White River Valley	owensboropflag@hotmail.com
PFLAG Hutchinson	pflagsomerset@gmail.com
PFLAG Kansas City	pflagalexandriala@gmail.com
PFLAG Lawrence/Topeka	info@pflaglafayette.org
PFLAG Lexington	info@pflagno.org
PFLAG Louisville	sherrykircus@gmail.com
PFLAG Owensboro	info@gbpflag.org
PFLAG Somerset	pflagattleboro@gmail.com
PFLAG Alexandria	info@pflagcapecod.org
PFLAG Lafayette	fhcpflag@gmail.com
PFLAG New Orleans	inquiries@pflagannapolis.org
PFLAG Shreveport	pflagbaltimore@gmail.com
Greater Boston PFLAG	pflagbelair@outlook.com
PFLAG Attleboro	pflagchestertown@gmail.com

PFLAG Brewster/Cape Cod	howard.jumel@pflaghoco.org
PFLAG Franklin / Hampshire	pflag.leonardtown@gmail.com
PFLAG Annapolis/Anne Arundel County	salisburypflag@outlook.com
PFLAG Baltimore	pflagcarroll@gmail.com
PFLAG Bel Air	pflaghoulton@gmail.com
PFLAG Chestertown	pflagportlandmaine@gmail.com
PFLAG Columbia/Howard County	watervillepflag@gmail.com
PFLAG Leonardtown	info@pflagaa.org
PFLAG Salisbury	pflag.ct@gmail.com
PFLAG Westminster/Carroll County	board@pflagdetroit.org
PFLAG Houlton	pflagflint@yahoo.com
PFLAG Portland	pflaglansing@gmail.com
PFLAG Waterville	pflaggp@gmail.com
PFLAG Ann Arbor	pflag.jackson2011@gmail.com
PFLAG Clinton Township	keweenawpflag@gmail.com
PFLAG Detroit	bobduman@yahoo.com
PFLAG Genesee County/Flint	pflaglivonia@gmail.com
PFLAG Greater Lansing	pflagmanistee@gmail.com
PFLAG Grosse Pointe	
PFLAG Jackson	pflagmuskegon@gmail.com
PFLAG Keweenaw	plymouthcantonpflag@gmail.com
PFLAG Livingston County	pflagporthuron@gmail.com
PFLAG Livonia	pflaggreatlakesbay@gmail.com
PFLAG Manistee	pflagmarshallbuffaloridge@gmail.com
PFLAG Marquette	pschroeder54@gmail.com

PFLAG Muskegon	pflagnewpraguemn@gmail.com
PFLAG Plymouth/Canton	pflagstcloud@gmail.com
PFLAG Port Huron	pflagcape@gmail.com
PFLAG Tri-Cities (Bay City, Saginaw, Midland)	pflagferguson@gmail.com
PFLAG Marshall/Buffalo Ridge	pflagpoplarbluff@hotmail.com
PFLAG Mora Area	love@pflagoftheozarks.org
PFLAG New Prague Area	stcharlespflag@gmail.com
PFLAG St. Cloud	pflagstjoe@yahoo.com
PFLAG Cape Girardeau	pflagstl@gmail.com
PFLAG Ferguson	pflag.gulfport@gmail.com
PFLAG Poplar Bluff	pflagjacksonms@aol.com
PFLAG Springfield	pflagtupelo@gmail.com
PFLAG St. Charles	info@pflagbozeman.org
PFLAG St. Joseph	pflagdillon@gmail.com
PFLAG St. Louis	info@pflagalamance.org
PFLAG Gulfport	connect@pflagasheville.org
PFLAG Jackson	info@pflagcharlotte.org
PFLAG Tupelo	info@ckpflag.org
PFLAG Bozeman/Gallatin Valley	pflagfayetteville@gmail.com
PFLAG Dillon	pflaghendersonville@gmail.com
PFLAG Alamance	pflaggaston2009@gmail.com
PFLAG Asheville	info@pflaggreensboro.org
PFLAG Charlotte	info@greenvillepflag.org
PFLAG Concord/Kannapolis	pflaghickorync@gmail.com
PFLAG Fayetteville	pflaglexingtonnc@gmail.com
PFLAG Flat Rock/Hendersonville	pflagtriangle@gmail.com

PFLAG Gaston	pflagrockymount@gmail.com
PFLAG Greensboro	salisburypflag@gmail.com
PFLAG Greenville	pflagwilmingtonnc@gmail.com
PFLAG Hickory	info@pflagws.org
PFLAG Lexington	pflagbismarck@gmail.com
PFLAG Raleigh-Durham/Triangle	gipflag@gmail.com
PFLAG Rocky Mount	pflaghastings@gmail.com
PFLAG Salisbury / Rowan	pflagkearney@gmail.com
PFLAG Wilmington/Cape Fear	president@pflagcornhusker.org
PFLAG Winston-Salem	info@pflag-omaha.org
PFLAG Bismarck	pflagnhinfo@pflagnh.org
PFLAG Grand Island	bergenpflag@gmail.com
PFLAG Hastings	pflagcollingswood@gmail.com
PFLAG Kearney	pflageht@gmail.com
PFLAG Lincoln	pflaghc@yahoo.com
PFLAG Omaha	pflagjerseycity@gmail.com
PFLAG New Hampshire	info@pflagjerseyshore.org
PFLAG Bergen County/Washington Township	pflagwaver@aol.com
PFLAG Collingswood	info@pflagprinceton.org
PFLAG Egg Harbor Township	contact@pflagabq.org
PFLAG Hunterdon County	lascrucespflag@gmail.com
PFLAG Jersey City	pflagsilvercity@gmail.com
PFLAG Jersey Shore	pflagofbouldercity@gmail.com
PFLAG North Jersey	pflagcarson@gmail.com
PFLAG Princeton	pflag.las.vegas@gmail.com

PFLAG Albuquerque	info@pflagbuffalo.org
PFLAG Las Cruces/Dona Ana	bcreeder@gmail.com
PFLAG Silver City	contact@pflagithacacortland.com
PFLAG Boulder City	frandivine@gmail.com
PFLAG Carson City	info@pflagli.org
PFLAG Las Vegas	info@pflagnyc.org
PFLAG Buffalo/Niagara Area	pflag@pflag-queens.org
PFLAG Chautauqua	rochesterpflag@gmail.com
PFLAG Ithaca/Cortland	pflagrocklandny@gmail.com
PFLAG Kingston	stateniland@pflagnyc.org
PFLAG Long Island	info@pflagwestchester.org
PFLAG New York City	pflagakron@aol.com
PFLAG Queens	info@pflagcinci.org
PFLAG Rochester	mail@pflagcleveland.org
PFLAG Rockland County	pflagcolumbus@gmail.com
PFLAG Staten Island	pflag@pflagdayton.org
PFLAG Westchester County	pflag.delaware@gmail.com
PFLAG Akron	pflagkent@gmail.com
PFLAG Cincinnati	pflaglimaoh@gmail.com
PFLAG Cleveland	oxfordareapflag@gmail.com
PFLAG Columbus	info@pflagtoledo.org
PFLAG Dayton	youngstownareapflag@gmail.com
PFLAG Delaware	normanpflag@gmail.com
PFLAG Kent	info@pflagoklahomacity.org
PFLAG Lima	ross-susan@sbcglobal.net
PFLAG Oxford	pflagcentraloregon@gmail.com

PFLAG Toledo	clackamascountypflag@gmail.com
PFLAG Youngstown	pflagflo@gmail.com
PFLAG Norman	pflagnewberg@gmail.com
PFLAG Oklahoma City	pflagocc@gmail.com
PFLAG Stillwater	pflag.pendleton.or@gmail.com
PFLAG Bend/Central Oregon	info@pflagpdx.org
PFLAG Clackamas County	pflagrsbg@gmail.com
PFLAG Florence	pflagsalemor@gmail.com
PFLAG Newberg	buckscountypflag@gmail.com
PFLAG Oregon Central Coast	danvillepflag@gmail.com
PFLAG Pendleton	pflaggbg@gmail.com
PFLAG Portland	pflagcenpa@yahoo.com
PFLAG Roseburg	pflagindiana@comcast.net
PFLAG Salem	pflagkulpssville@gmail.com
PFLAG Bucks County	jcbort@comcast.net
PFLAG Danville	pflagphila@yahoo.com
PFLAG Greensburg	info@pflagpgh.org
PFLAG Harrisburg/Central Pennsylvania	pflagroyersford@gmail.com
PFLAG Indiana	lynda.carcione@gmail.com
PFLAG Kulpssville	pflagyork@gmail.com
PFLAG Media	pflagprovidence@gmail.com
PFLAG Philadelphia	pflagaikn@gmail.com
PFLAG Pittsburgh	cola.pflag@gmail.com
PFLAG Royersford	susanpflag@gmail.com
PFLAG West Chester/Chester County	pflagspartanburg@gmail.com
PFLAG York	revterijohnson7@gmail.com
PFLAG Greater Providence	pflagathens@gmail.com

PFLAG Aiken	cooperpeople@comcast.net
PFLAG Columbia	tedpm356@gmail.com
PFLAG Greenville	pflagfranklin@gmail.com
PFLAG Spartanburg	information@pflagtricity.org
PFLAG Brookings	pflagmboro@yahoo.com
PFLAG Athens	info@pflagnashville.org
PFLAG Chattanooga	backusanne@comcast.net
PFLAG Crossville/Cumberland and County	tullahomapflag@gmail.com
PFLAG Franklin	pflag_bc@yahoo.com
PFLAG Johnson City/Tri-Cities	info@pflagaustin.org
PFLAG Murfreesboro	beaumontpflag@gmail.com
PFLAG Nashville	support@pflagboerne.org
PFLAG Oak Ridge	pflagbrenham@gmail.com
PFLAG Tullahoma	pflagdallas@outlook.com
PFLAG Abilene/Big Country	pflagelpaso@gmail.com
PFLAG Austin	info@pflagfortworth.org
PFLAG Beaumont	pflag.harlingen.tx@gmail.com
PFLAG Boerne	janice_anderson@yahoo.com
PFLAG Brenham	pflaglgv@gmail.com
PFLAG Dallas	president@pflaglubbock.org
PFLAG El Paso	pflagmidlandodessatexas@gmail.com
PFLAG Fort Worth	montgomerypflag@gmail.com
PFLAG Harlingen	sapflag@gmail.com
PFLAG Houston	pflag210@gmail.com
PFLAG Longview	pflagseguin@gmail.com
PFLAG Lubbock	pflageasttexas@yahoo.com
PFLAG Midland/Odessa	drbuck55@hotmail.com
PFLAG Montgomery	pflaglogan@gmail.com
PFLAG San Angelo	provopflag@gmail.com

PFLAG San Antonio	slcpflag@gmail.com
PFLAG Seguin	pflag.saintgeorge@gmail.com
PFLAG Tyler/East Texas	pflagbr@gmail.com
PFLAG Ephraim/Sanpete County	floydpflag@gmail.com
PFLAG Logan/Cache Valley	pflagnorfolk@gmail.com
PFLAG Provo/Utah County	pflagrichmondva@gmail.com
PFLAG Salt Lake City	pflagwilliamsburg@gmail.com
PFLAG St. George	pflag.dorset@gmail.com
PFLAG Charlottesville/Harrisonburg	info@pflagbellevue.org
PFLAG Floyd	whatcompflag@gmail.com
PFLAG Norfolk / South Hampton Roads	info@pflagbf.org
PFLAG Richmond	kitsappflag@yahoo.com
PFLAG Williamsburg	everett.wa.pflag@gmail.com
PFLAG Dorset	manelson@teleport.com
PFLAG Bellevue/Eastside	president@pflag-olympia.org
PFLAG Bellingham/Whatcom County	info@pflagseattle.org
PFLAG Benton / Franklin	pflag.skagit@gmail.com
PFLAG Bremerton/Kitsap County	info@pflagspokane.org
PFLAG Everett	mail@pflagtacoma.org
PFLAG Lower Columbia	info@pflagswa.org
PFLAG Olympia	info@pflagwhidbeyisland.org
PFLAG Seattle	pflag.cambridge@gmail.com
PFLAG Skagit	pflagmadison@gmail.com

PFLAG Spokane	pflagmanty@gmail.com
PFLAG Tacoma	pflagmilwaukee@hotmail.com
PFLAG Vancouver/SW Washington	chapter@pflagmoho.org
PFLAG Whidbey Island	pflag.oconomowoc@gmail.com
PFLAG Cambridge	ibloomwhereplanted@gmail.com
PFLAG Madison	pflagsturgeonbay@gmail.com
PFLAG Manitowoc County	nancyhanson1958@yahoo.com
PFLAG Milwaukee	pflagfairmont@gmail.com
PFLAG Mt. Horeb	casperpflag@gmail.com
PFLAG Oconomowoc	gillettepflag@yahoo.com
PFLAG River Falls	jacksonpflag@wyoming.com
PFLAG Sturgeon Bay/Door County	pflaglaramie@gmail.com
PFLAG Washburn	pflagcody@gmail.com
PFLAG Fairmont	ki4ggk@gmail.com

Appendix B: LGBIS

LGBIS		
Question	Response	Subscale
I prefer to keep my same-sex romantic relationships rather private	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Concealment Motivation
If it were possible, I would choose to be straight.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Internalized Homonegativity

I'm not totally sure what my sexual orientation is.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Uncertainty
I keep careful control over who knows about my same-sex romantic relationships.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Concealment Motivation
I often wonder whether others judge me for my sexual orientation.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Acceptance Concerns
I am glad to be an LGB person.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Affirmation
I look down on heterosexuals.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Superiority
I keep changing my mind about my sexual orientation.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Uncertainty
I can't feel comfortable knowing that others judge me negatively for my sexual orientation.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Acceptance Concerns

I feel that LGB people are superior to heterosexuals.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Superiority
My sexual orientation is an insignificant part of who I am.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Centrality
Admitting to myself that I'm an LGB person has been a very painful process.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Difficult Process
I'm proud to be part of the LGB community.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Affirmation
I can't decide whether I am bisexual or homosexual.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Uncertainty
My sexual orientation is a central part of my Identity.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Centrality
I think a lot about how my sexual orientation affects the way people see me.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Acceptance Concerns

Admitting to myself that I'm an LGB person has been a very slow process.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Difficult Process
Straight people have boring lives compared with LGB people.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Superiority
My sexual orientation is a very personal and private matter.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Concealment Motivation
I wish I were heterosexual.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Internalized Homonegativity
To understand who I am as a person, you have to know that I'm LGB.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Centrality
I get very confused when I try to figure out my sexual orientation.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Uncertainty
I have felt comfortable with my sexual identity just about from the start.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Difficult Process

Being an LGB person is a very important aspect of my life.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Centrality
I believe being LGB is an important part of me.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Centrality
I am proud to be LGB.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Identity Affirmation
I believe it is unfair that I am attracted to people of the same sex.	<ul style="list-style-type: none"> • Disagree Strongly • Disagree • Disagree Somewhat • Agree Somewhat • Agree • Agree Strongly 	Internalized Homonegativity

Appendix C PS-ECDI

Penn State Electronic Cigarette Dependence Index		
<i>Question</i>	Response options	Question on survey
How many times per day do you usually use your e-cigarette? Assume that one "time" consists of around 15 puffs or lasts around 10 minutes	0 - 4 Times per Day 5 - 9 Times per Day 10 - 14 Times per Day 15 - 19 Times per Day 20 - 29 Times per Day 30+ Times per Day	Q34
On days that you can use your e-cigarette freely, how soon after you wake up do you first use your e-cigarette?	0 - 5 Minutes 6 - 15 Minutes 16 - 30 Minutes 31 - 60 Minutes 61 - 120 Minutes 121+ Minutes	Q35

Do you sometimes awaken at night to use your e-cigarette?	Yes No	Q36
If yes, how many nights per week do you typically awaken to use your e-cigarette?	I do not wake up to use my electronic cigarette. 0 - 1 Nights 2 - 3 Nights 4+ Nights	Q37
Do you use your e-cigarette now because it is really hard to quit?	Yes No	Q38
Do you ever have strong cravings to use your e-cigarette?	Yes No	Q39
Over the past week, how strong have the urges to use your e-cigarette been?	None / Slight Moderate / Strong Very Strong / Extremely Strong	Q40
Is it hard to keep from using your e-cigarette in places where you are not supposed to?	Yes No	Q41
Did you feel more irritable because you could not use your e-cigarette?	Yes No	Q42
Did you feel nervous, restless, or anxious because you couldn't use your e-cigarette?	Yes No	Q43

Appendix D: Consent Form

This study aims to analyze the relationship between various identities and E-cigarette use. I am requesting your participation, which will involve filling out the 64 question survey. Your participation in this study is voluntary. If you choose not to participate or to withdraw from this study at any time, there will be no penalty. If at any time you discontinue the survey, your results will be discarded. The attached questionnaire/survey is anonymous. The results of the study may be published but your name will not be known.

There are no risks associated with participation in the study. The potential benefits of the study include informing and helping guide future health interventions related to E-cigarette use in the LBGTQ Community.

If you have any questions concerning the research study, please call the Principal Investigator, Marshall Cheney, PhD at marshall@ou.edu. For questions about your rights as a participant, contact the OUHSC Director of the Human Research Participant Program at (405) 271-2045.

Appendix E: Full Survey

Start of Block: Screener

1 What is your Prolific ID? (if you do not have one, please skip.)

1 Captcha

2 How old are you?

3 What state do you currently reside in?

4 Are you a United States Citizen?

Yes (1)

No (2)

5 In the past 30 days I have used an e-cigarette... ("E-cigarettes are devices that produce an aerosol by heating a liquid that usually contains nicotine, and other chemicals that help to make the aerosol. Users inhale this aerosol into their lungs." – CDC)

- Never (1)
 - Not in the last 30 days (2)
 - 1 - 5 days in the last 30 days (3)
 - 6 - 10 days in the last 30 days (4)
 - 11 - 15 days in the last 30 days (5)
 - 16 - 20 days in the last 30 days (6)
 - 21 - 25 days in the last 30 days (7)
 - 26 - 30 days in the last 30 days (8)
-

6 Do you own your own e-cigarette or other vaping device?

- Yes (If so please indicate what kind) (1)

 - No (2)
-

7 Do you consider yourself to be:

- Woman (1)
 - Man (2)
 - Trans-woman (3)
 - Trans-man (4)
 - Non-Binary (5)
 - Gender Nonconforming (6)
 - Not listed, please describe (7) _____
-

8 Do you consider yourself to be:

- Heterosexual or straight (1)
- Gay (2)
- Lesbian (3)
- Bisexual (4)
- Queer (5)
- Not Listed. Please Describe: (6) _____

End of Block: Screener

Start of Block: Consent

9 Would you like to be involved in research at the University of Oklahoma?

I am Dr Marshall Cheney from the Department of Health and Exercise Science and I invite you to participate in my research project entitled e-cigarette use among LGBQ adults. This research is being conducted online through The University of Oklahoma. You were selected as a possible participant because you met the requirements to participate in this study. You must be at least 18 years of age to participate in this study. You must be a citizen of the United States to participate in this study. You will

also need to have access to a computer with a good internet connection or a smartphone to participate. **Please read this document and contact me to ask any questions that you may have BEFORE agreeing to take part in my research.**

What is the purpose of this research? The purpose of this research is to understand the reasons behind e-cigarette use in the LGBTQ community.

How many participants will be in this research? About 800 people will take part in this research.

What will I be asked to do? If you agree to be in this research, you will answer questions regarding your e-cigarette use, other tobacco use, LGBTQ identity, racial and ethnic origin, and COVID-19's impact on your tobacco use. You also authorize the use of information you just gave us in the questionnaire to be used for our research.

How long will this take? Your participation will take about 10 minutes.

What are the risks and/or benefits if I participate? There are no risks and no benefits from being in this research.

Will I be compensated for participating? You will be reimbursed for your time and participation in this research. You will be paid \$2.52 (\$11.63/hr) for your participation upon completion of the study.

Who will see my information? In research reports, there will be no information that will make it possible to identify you. Research records will be stored securely, and only approved researchers and the OU Institutional Review Board will have access to the records. Data are collected via an online platform not hosted by OU that has its own privacy and security policies for keeping your information confidential. Please note no assurance can be made as to the use of the data you provide for purposes other than this research.

What will happen to my data in the future? After removing all identifiers, we might share your data with other researchers or use it in future research without obtaining additional consent from you. The data will be stored for 5 years after publication, then it will be destroyed.

Do I have to participate? No. If you do not participate, you will not be penalized or lose benefits or services unrelated to the research. If you decide to participate, you don't have to answer any question and can stop participating at any time.

Who do I contact with questions, concerns, or complaints? If you have questions, concerns or complaints about the research or have experienced a research-related injury, contact me at marshall@ou.edu Or Kenneth.w.bush@ou.edu,

You can also contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu if you have questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than the researcher(s) or if you cannot reach the researcher(s).

This research has been approved by the University of Oklahoma, Norman Campus IRB. IRB Number: 13429 Approval date: 05/20/2021

Please print this document for your records. By providing information to the researcher(s), I am agreeing to participate in this research.

- I agree to participate (1)
- I do not want to participate (2)

End of Block: Consent

Start of Block: LGBIS

10 For each of the following questions, please mark the response that best indicates your current experience as a Lesbian, Gay, Bisexual, or Queer (LGBQ) person. Please be as honest as possible. Indicate how you really feel now, not how you think you should feel. There is no need to think too much

about any one question. Answer each question according to your initial reaction and then move on to the next.

	Disagree Strongly (1)	Disagree (2)	Disagree Somewhat (3)	Agree Somewhat (4)	Agree (5)	Agree Strongly (6)
I prefer to keep my same-sex romantic relationships rather private. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If it were possible, I would choose to be straight. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm not totally sure what my sexual orientation is. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I keep careful control over who knows about my same-sex romantic relationships. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often wonder whether others judge me for my sexual orientation. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am glad to be an LGBQ person. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Disagree Strongly (1)	Disagree (2)	Disagree Somewhat (3)	Agree Somewhat (4)	Agree (5)	Agree Strongly (6)
I look down on heterosexuals. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I keep changing my mind about my sexual orientation. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can't feel comfortable knowing that others judge me negatively for my sexual orientation. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that LGBTQ people are superior to heterosexuals. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My sexual orientation is an insignificant part of who I am. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Admitting to myself that I'm an LGBTQ person has been a very painful process. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12 For each of the following questions, please mark the response that best indicates your current experience as a Lesbian, Gay, Bisexual, or Queer (LGBQ) person. Please be as honest as possible. Indicate how you really feel now, not how you think you should feel. There is no need to think too much about any one question. Answer each question according to your initial reaction and then move on to the next.

	Disagree Strongly (1)	Disagree (2)	Disagree Somewhat (3)	Agree Somewhat (4)	Agree (5)	Agree Strongly (6)
I'm proud to be part of the LGBQ community. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can't decide whether I am bisexual or homosexual. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My sexual orientation is a central part of my identity. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think a lot about how my sexual orientation affects the way people see me. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Admitting to myself that I'm an LGBQ person has been a very slow process. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Straight people have boring lives compared with LGBQ people. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Disagree Strongly (1)	Disagree (2)	Disagree Somewhat (3)	Agree Somewhat (4)	Agree (5)	Agree Strongly (6)
My sexual orientation is a very personal and private matter. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wish I were heterosexual. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To understand who I am as a person, you have to know that I'm LGBTQ. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get very confused when I try to figure out my sexual orientation. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have felt comfortable with my sexual identity just about from the start. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



	Disagree Strongly (1)	Disagree (2)	Disagree Somewhat (3)	Agree Somewhat (4)	Agree (5)	Agree Strongly (6)
Being an LGBTQ person is a very important aspect of my life. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe being LGBTQ is an important part of me. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am proud to be LGBTQ. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe it is unfair that I am attracted to people of the same sex. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: LGBIS

Start of Block: E-cig dependence + use

Here we are going to ask you a little about your e-cigarette use.

15 How many times per day do you usually use your e-cigarette? *Assume that one "time" consists of around 15 puffs or lasts around 10 minutes*

- 0 - 4 Times per Day (1)
 - 5 - 9 Times per Day (2)
 - 10 - 14 Times per Day (3)
 - 15 - 19 Times per Day (4)
 - 20 - 29 Times per Day (5)
 - 30+ Times per Day (6)
-

16 On days that you can use your e-cigarette freely, how soon after you wake up do you first use your e-cigarette?

- 0 - 5 Minutes (1)
 - 6 - 15 Minutes (2)
 - 16 - 30 Minutes (3)
 - 31 - 60 Minutes (4)
 - 61 - 120 Minutes (5)
 - 121+ Minutes (6)
-

17 Do you sometimes awaken at night to use your e-cigarette?

- Yes (1)
 - No (2)
-

18 If yes, how many nights per week do you typically awaken to use your e-cigarette?

- I do not wake up to use my electronic cigarette (1)
 - 0 - 1 Nights (2)
 - 2 - 3 Nights (3)
 - 4+ Nights (4)
-

19 Do you use your e-cigarette now because it is really hard to quit?

- Yes (1)
 - No (2)
-

20 Do you ever have strong cravings to use your e-cigarette?

- Yes (1)
 - No (2)
-

21 Over the past week, how strong have the urges to use your e-cigarette been?

- None / Slight (1)
 - Moderate / Strong (2)
 - Very Strong / Extremely Strong (3)
-

22 Is it hard to keep from using your e-cigarette in places where you are not supposed to?

Yes (1)

No (2)

23 (Over the past week) Did you feel more irritable because you could not use your e-cigarette?

Yes (1)

No (2)

24 (Over the past week) Did you feel nervous, restless, or anxious because you couldn't use your e-cigarette?

Yes (1)

No (2)

Page Break

Now we would like to ask you a few questions about the types of tobacco products you use.

25 Please indicate if you have used any of the following tobacco products EVER (even just one time) or in the PAST 30 DAYS.

	Used in past 30 Days (1)	Have used but not in past 30 Days (2)	Never Used (3)
Regular cigarettes (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Style of E-Cigarette (other than the indicated earlier) (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roll-Your-Own Cigarettes (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flavored Cigarettes such as Camel Crush (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clove Cigars (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flavored Little Cigars (Cigarillos) (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smoking Tobacco from a Hookah or a Water Pipe (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snus, such as Camel or Marlboro Snus (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dissolvable Tobacco Products such as Ariva, Stonewall, Camel Orbs, Camel Sticks, or Camel Strips (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some other new Tobacco Product not listed here (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26 How many of your five closest friends use e-cigarettes?

0 1 2 3 4 5

Number of friends ()	
-----------------------	--

27 How frequently do you see advertisements for e-cigarettes or other tobacco products that target LGBTQ people?

- Never or almost never (1)
- At least once a month, but less than once a week (2)
- At least once a week (3)

End of Block: E-cig dependence + use

Start of Block: Demographics

Now we will ask you some questions to help us get to know you.

28 How did you find out about this survey

29 Are you Hispanic/Latinx/or of other Spanish origin

Yes (1)

No (2)

30 Which of the following do you **most** identify with:
(Please select one)

American Indian or Alaska Native (1)

Asian (2)

Black or African American (3)

Native Hawaiian or other Pacific Islander (4)

White (5)

Not listed, please describe (6) _____

31 How would you describe the place where you live?

Rural (1)

Suburban (2)

Urban (3)

32 What is the highest level of education you have completed?

- Some High School (1)
 - High School (2)
 - Associate's Degree, Technical School, or Career College (3)
 - Bachelor's Degree (4)
 - Master's Degree (5)
 - Ph.D. or other Doctorate (6)
-

33 What is your employment status?

- Employed Full-Time (1)
- Employed Part-Time (2)
- Seeking employment (3)
- Part Time Student, Have outside employment (5)
- Full Time Student, No outside employment (6)

End of Block: Demographics

Start of Block: COVID

Now we will ask you some questions to help us understand more about your experiences during the COVID-19 pandemic.

34

Before COVID-19 came to the US, I would use an e-cigarette...

- 0 days out of 30 days (1)
 - 1 - 5 days out of 30 days (2)
 - 6 - 10 days out of 30 days (3)
 - 11 - 15 days out of 30 days (4)
 - 16 - 20 days out of 30 days (5)
 - 21 - 25 days out of 30 days (6)
 - 26 - 30 days out of 30 days (7)
-

35 In the Summer of 2020, I would use an e-cigarette...

- 0 days out of 30 days (1)
 - 1 - 5 days out of 30 days (2)
 - 6 - 10 days out of 30 days (3)
 - 11 - 15 days out of 30 days (4)
 - 16 - 20 days out of 30 days (5)
 - 21 - 25 days out of 30 days (6)
 - 26 - 30 days out of 30 days (7)
-

36 Before COVID-19 came to the US, how would you describe your financial situation? At the end of the month:

- I have money left over (1)
 - I broke even (2)
 - I did not have enough money (3)
-

37 How would you describe your **current** financial situation? At the end of the month:

- I have money left over (1)
 - I break even (2)
 - I do not have enough money (3)
-

38 Have you contracted COVID?

- No, have not contracted COVID-19 (1)
 - Yes, I believe I had COVID but did not receive a test to confirm (2)
 - Yes, received a positive test result (3)
-

39 Before COVID-19 came to the US, I struggled with:

- Depression (1)
 - Anxiety (2)
 - Another mental health challenge (3)
 - None of these (4)
-

Display This Question:

If Before COVID-19 came to the US, I struggled with: = Depression

Or Before COVID-19 came to the US, I struggled with: = Anxiety

Or Before COVID-19 came to the US, I struggled with: = Another mental health challenge

40 In the Summer of 2020, these mental health challenges were _____ than they were before COVID-19 came to the US.

- Better (1)
 - About the same (2)
 - Worse (3)
-

Display This Question:

If Before COVID-19 came to the US, I struggled with: = Depression

Or Before COVID-19 came to the US, I struggled with: = Anxiety

Or Before COVID-19 came to the US, I struggled with: = Another mental health challenge

41 Compared to Summer 2020, these mental health challenges **now** are:

- Better (1)
- About the same (2)
- Worse (3)

Display This Question:

If Before COVID-19 came to the US, I struggled with: = None of these

42 In the Summer of 2020, my mental health was _____ than it was before COVID-19 came to the US.

- Better (1)
 - About the same (2)
 - Worse (3)
-

Display This Question:

If Before COVID-19 came to the US, I struggled with: = None of these

43 Compared to Summer 2020, my mental health **now** is:

- Better (1)
- About the same (2)
- Worse (3)

End of Block: COVID

Start of Block: Prolific

44 If you found this study through prolific, please copy and paste the link to be redirected back to their website:

<https://app.prolific.co/submissions/complete?cc=82E8CADC>

To end the survey, please click the arrow below.

End of Block: Prolific