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Healthier Together? A Meta-Analytic Review of Community Identification and LGBTQ Health

By

Kendall A. Lawley

Accepted in Partial Completion
of the Requirements for the Degree
Master of Science

ADVISORY COMMITTEE

Dr. Barbara J. Lehman, Chair

Dr. James M. Graham

Dr. Aaron J. Smith

GRADUATE SCHOOL

David L. Patrick, Interim Dean

Master's Thesis

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Kendall A. Lawley

November 15, 2019

**Healthier Together? A Meta-Analytic Review of Community Identification and LGBTQ
Health**

A Thesis
Presented to
The Faculty of
Western Washington University

In Partial Fulfillment
Of the Requirements for the Degree
Master of Science

by
Kendall A. Lawley
November 2019

Abstract

Much of the existing research in the area of LGBTQ health demonstrates that LGBTQ individuals have worse health than non-LGBTQ individuals. The proposed reason for these disparities is minority stress. Some existing research does not support the idea that LGBTQ individuals have worse health than non-LGBTQ individuals, resulting in mixed findings in the literature. Previous works in the social identity literature suggest that identifying as a member of a social group predicts better health and greater well-being. Identifying with the LGBTQ community may act as a buffer against the negative health outcomes of experiencing minority stress for LGBTQ individuals. The current study utilized multilevel meta-analytic techniques to explore the relationship between LGBTQ community identification and four main indicators of physical health identified in the literature: substance use, sexual behavior, health status, and utilization of health services. Ninety-nine effect sizes from 32 articles were analyzed using multilevel random effects models. Stronger identification with the LGBTQ community was found to be associated with greater substance use ($r = -.058$, $p = .037$, 95% CI = $-.113, -.003$). No other indicators of physical health were statistically significantly associated with LGBTQ community identification. Additionally, moderators of the association between LGBTQ community identification and each of the four indicators of physical health were explored. Findings indicate that stronger identification with the LGBTQ community may not foster community resilience, especially for LGBTQ individuals with multiple marginalized identities.

Acknowledgements

This project would not have been possible without the support and guidance of numerous people. First and foremost, I would like to thank my thesis advisor and mentor, Dr. Barbara Lehman, for supporting me, inspiring me, and shaping me into a capable researcher. I am eternally grateful for the time and energy she has invested in my success. I would like to thank my committee members, Dr. Jim Graham and Dr. Aaron Smith, for generously sharing their time and expertise to help develop this project. Their feedback and encouragement were immensely helpful. I would like to thank my husband for being my cheerleader and my biggest supporter throughout this process. His continuous encouragement and absolute belief in my abilities kept me going. I would like to thank the faculty, staff, and students that make up Western Washington University's psychology department for providing me with a phenomenal education and an extensive support system. I would like to thank the exceptional women in my cohort whose intelligence, determination, and perseverance continue to inspire me. Finally, I would like to thank the LGBTQ activists, past and present, whose tireless fight for equity and justice has changed the way the field of psychology conceptualizes LGBTQ health. Without their sacrifice, this research would not exist.

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Healthier Together? A Meta-Analytic Review of Community Identification and LGBTQ Health

Lesbian, gay, bisexual, transgender, and queer (LGBTQ) identifying individuals experience a complex interplay of unique biological, psychological, and interpersonal experiences that contribute to overall health, but research on the health outcomes and health behaviors of LGBTQ individuals, and potential factors that may influence health, is limited and has produced mixed results. Much of the existing research shows that LGBTQ individuals have worse health outcomes and engage in more harmful health behaviors than non-LGBTQ identifying individuals (Case, et al., 2004; Conron, Mimiaga, & Landers, 2010). The most widely recognized reason for these health disparities in the LGBTQ community is the stigma associated with LGBTQ identities and the experiences of discrimination and oppression that stem from this stigma. However, some existing research on LGBTQ health either does not support, or directly contradicts the idea that LGBTQ individuals have worse health outcomes and engage in more harmful health behaviors than non-LGBTQ individuals. These contradictory findings will be addressed in the section on health outcomes and health behaviors of this paper. These conflicting findings suggest that another factor may be influencing these important health outcomes.

Previous research supports the idea that identifying as a member of a particular social group predicts better health and greater well-being (Haslam, Jetten, Postmes, & Haslam, 2009). With this in mind, personally identifying with the LGBTQ community may affect some of the positive and negative health outcomes experienced by LGBTQ individuals. Identification with the LGBTQ community can be achieved in a variety of ways, but typically involves an element of socially or psychologically associating with the LGBTQ label or being personally involved in events or social gatherings pertaining to the LGBTQ community. The present study will explore the relationship between identification with the LGBTQ community and indicators of physical health.

LGBTQ Terminology

The language used to identify as an LGBTQ individual is rapidly changing, and these changes often produce many different words and concepts related to the LGBTQ experience that may be unclear without prior exposure to these ideas. One of the most important distinctions is the difference between sexual orientation and gender identity. The LGBTQ acronym includes individuals who identify as sexual minorities and individuals who identify as gender minorities, but these identities are distinct. Sexual orientation is characterized as patterns of enduring sexual or romantic attraction to people of certain genders. For example, lesbian women are attracted to other women, whereas bisexual women may be attracted to people of multiple gender identities. In contrast, gender identity is characterized as a person's concept and perception of their own gender, which many or may not correspond with the sex they were assigned at birth. A person whose gender identity does not correspond with the sex they were assigned at birth is considered transgender, regardless of whether they have taken steps to alter their gender presentation. For example, an individual who was assigned the label of male at birth but identifies as a woman is a transgender woman. Additionally, many transgender individuals may choose to change their appearance through clothing choices, hormone therapies, or surgeries, or many change their name or pronouns in order to present themselves in accordance with the gender identity with which they identify. A transgender individual who is in the process of making these changes to alter their gender expression is considered to be transitioning.

A person whose gender identity does correspond with the sex they were assigned at birth is cisgender. An individual who was assigned female at birth and identifies as a woman is a cisgender woman. A person's gender identity may fall somewhere between the gender binary of man or woman, or a person's gender identity may fall outside of the gender binary, meaning a

person may identify with a gender along a spectrum in between man and woman, or may not identify with either label at all. A person whose gender identity does not fit within the established categories of man and women is considered genderqueer or non-binary. Finally, the term queer is a label that an individual may use to signify any sexual orientation or gender identity that is not heterosexual or cisgender (Human Rights Campaign, n.d.). There are many different sexual and gender identities that fall under the umbrella of the LGBTQ acronym and all individuals in this community experience varying levels of stigma, discrimination, and oppression.

Minority Stress

Though sexual orientation and gender identity are different concepts, both sexual minority and gender minority individuals experience discrimination and minority stress in similar ways. Minority stress theory is a subtype of social stress theory that posits that individuals from marginalized social groups experience additional, unique stressors, above and beyond typical life stressors, due to having marginalized identities (Meyer, 2003). In order to conceptualize the specific minority stress processes that affect sexual minority individuals, Meyer's minority stress model suggests lesbian, gay, and bisexual individuals experience more stress than heterosexual people because they are subject to stigma and discrimination due to their sexual minority identity. According to this model, identity-related stressors can lead to a variety of physical and mental health disorders (Meyer & Frost, 2013). For example, if a gay man were to experience antigay discrimination, the experience could result in him experiencing more vigilance and expectations of rejection based on his sexual orientation. The vigilance and fear of rejection would produce unique stress above and beyond the other daily stress he would typically

experience. The addition of sexual identity related stressors in his life could contribute to poorer overall health (Meyer, 2003).

Though the minority stress model was conceptualized in the context of sexual orientation, Testa, Habarth, Peta, Balsam, and Bockting (2015) adapted the model for transgender and other gender minority individuals. Bockting, Miner, Swinburne Romaine, Hamilton, and Coleman (2013) suggest that minority stress influences the health and well-being of gender minorities similarly to sexual minorities. Because of this, it is appropriate to apply the minority stress model and the concept of minority coping to any LGBTQ individual, not just sexual minorities.

For individuals with marginalized identities, experiences with discrimination and other forms of minority stress can be traumatic and previous research has indicated that exposure to trauma or adversity, even events that only occur one time, is associated with a range of physical health problems. Consequences of adversity can be found in most of the body's major functioning systems including the cardiovascular system, neuroendocrine functioning, and immunological functioning (D'Andrea, Sharma, Zelechowski, & Spinazzola, 2011). Additionally, previous research has also shown that LGBTQ individuals are at an elevated risk for developing mental health disorders (Gilman, Cochran, Mays, Hughes, Ostro, & Kessler, 2001) and physical health concerns (Meyer, 2003) compared to non-LGBTQ identifying individuals. There is some indication that one reason for these health disparities is the discrimination and LGBTQ identity-related stressors that LGBTQ individuals experience (Frost, Lehavot, & Meyer, 2015; Meyer, 2015). Instances of discrimination can range from subtle microaggressions (Nadal, Whitman, Davis, Erazo, & Davidoff, 2016) to overt hate crimes (Gruenewald, 2012). Even more benign microaggressions, such as heterosexist language or dismissal of the validity of an LGBTQ

identity, can be experienced similarly to more extreme forms of discrimination, such as violent victimization (Balsam, Rothblum, & Beauchaine, 2005; Nadal, 2018).

Many LGBTQ people face adversity due to their sexual orientations and gender identities. For example, Robinson and Rubin (2016), found that sexual minority individuals who experience more microaggressions in response to their sexual orientation also exhibit more posttraumatic stress symptoms. Similarly, a study using data from the Midlife Development in the United States (MIDUS) survey found that many sexual orientation-related differences in mental health indicators can be explained by the higher prevalence of day-to-day discrimination experienced by lesbian, gay, and bisexual individuals than heterosexual individuals (Mays & Cochran, 2001).

LGBTQ Health and Health Behaviors

Previous research has implicated discrimination as a contributor to a wide variety of long-term health problems and unhealthy behaviors for individuals with marginalized identities. A meta-analysis by Pascoe and Richman (2009) reported that experiences of perceived discrimination predict heightened and more frequent physiological responses to stress, increased involvement in unhealthy behaviors, such as smoking, and decreased involvement in healthy behaviors, such as condom use. These findings indicate that discrimination is not only psychologically harmful, but it is also physically harmful. With this in mind, it is important to review the existing literature on a variety of different health domains for LGBTQ individuals to try to make sense of the overall health and well-being of the LGBTQ community. Additionally, any information regarding LGBTQ community involvement or community identification in terms of each health outcome and health behavior covered will be included to provide support for the idea that identification with the LGBTQ community can influence health.

There are many gaps in the existing LGBTQ health literature and as a result, there are some important indicators of physical health that are missing from this literature review. Though sparse, this review covers the health outcomes and health behaviors that have received enough attention to provide meaningful information regarding LGBTQ health. Similarly, not every sub-identity within the LGBTQ community is equally represented in the existing research. For example, much of the research that was found for this review and subsequent meta-analyses focuses on the health of cisgender gay men and very little research focuses on the health of transgender and gender non-conforming individuals. Though the disproportionate representation of research on individuals with different LGBTQ identities makes this review inequitable, it also highlights an important need for LGBTQ health research to be more inclusive.

Mortality.

In the United States, few national population-based surveys ask participants to report sexual orientation or gender identity. Because of this, it is challenging to compile data regarding LGBTQ life expectancy in the United States. The lack of accurate data on LGBTQ life expectancy hinders the ability to identify mortality disparities in the LGBTQ community, thus making it challenging for researchers and health organizations to adequately address disparities (Haas & Lane, 2015).

Additionally, research on LGBTQ health in general needs to be expanded. In a meta-analysis of medical publications about LGBTQ individuals published between 1950 and 2007 Snyder (2011) found that research on HIV/AIDS accounted for one fourth of all literature on LGBTQ health. When including research on other sexually transmitted diseases and infections in LGBTQ populations, that number increases to one third. This research is important considering HIV/AIDS still has no cure and it disproportionately affects gay and bisexual men, (Centers for

Disease Control and Prevention, 2017) but the predominance of research on one health outcome means that other health outcomes and behaviors prevalent in LGBTQ communities may be underexamined. The lack of adequate research on other health outcomes and on health behaviors further contributes to the lack of understanding of mortality disparities in the LGBTQ community.

However, few studies on LGBTQ mortality have been conducted. One of the most compelling studies published on LGBTQ life expectancy concluded that gay and bisexual men were expected to live between 8 and 21 years less than heterosexual men. These findings indicated that gay and bisexual men living in urban areas were expected to have a life expectancy similar to that of men living in the 1800's (Hogg, Strathdee, Craib, O'Shaughnessy, Montaner, & Schechter, 1997). Similarly, in an examination of obituaries published in gay journals and newspapers as well as mainstream newspapers, Cameron, Playfair, and Wellum (1994) found that both gay men and lesbian women had a lower median age of death than heterosexual men and women when AIDS related deaths were both included and excluded. Specifically, for heterosexual, married men and women the median ages of death were 75 and 79 respectively and for heterosexual unmarried men and women the median ages of death were 57 and 71 respectively. For gay men who died of AIDS and for gay men who did not die of AIDS, the median ages of death were 39 and 42 respectively. Finally, the median age of death for lesbian women was 44. Cameron, Playfair, and Wellum's research was important because it demonstrated that there are factors other than AIDS contributing to LGBTQ mortality. It is important to consider these other factors and how they contribute to the health and well-being of LGBTQ populations.

Health Behaviors.

Health behaviors are personal actions that can either improve or impair physical health. Health behaviors include factors such as diet, exercise, and substance use (Conner & Norman, 2017). Research on health behaviors in any population is important because it can inform effective interventions, leading to healthier people (Michie & Abraham, 2004). Though it is important to take it a step further and understand demographic-related differences in certain health behaviors. Being aware of specific health behaviors that are more prevalent in particular communities creates an opportunity for even more targeted intervention programs, aimed at addressing the unique needs of different groups. The following sections will examine the existing literature on health behaviors pertinent to LGBTQ populations.

Smoking.

Cigarette use has been well-documented as a negative health behavior that is disproportionately high among LGBTQ individuals (Ryan, Wortley, Easton, Pederson, & Greenwood, 2001). Both sexual minority individuals (Centers for Disease Control and Prevention, 2015) and gender minority individuals (Buchting, et al., 2017) have been found to use cigarettes at higher rates than the overall population. More than 30,000 LGBTQ individuals die from tobacco-related diseases each year (DC Center for the LGBT Community, 2015), but smoking is one of the most preventable causes of early mortality in the United States (Centers for Disease Control and Prevention, 2014). Previous research has implicated minority stress as a potential explanation for the high rates of smoking in LGBTQ populations (Blosnich & Horn, 2011; Gamarel, Merish, Manning, Iwamoto, Operario, & Nemoto, 2016; O’Cleirigh et al., 2015).

Research on the effects of LGBTQ community involvement on smoking behavior is mixed. A sizable body of research suggests that involvement with the LGBTQ community is positively associated with cigarette use. For example, many LGBTQ specific venues, such as

bars and nightclubs, have a history of being associated with cigarette use and more frequent attendance to these types of venues may result in more exposure to an environment where smoking is normalized (Holloway et al, 2012). Similarly, the tobacco industry has created marketing strategies and campaigns with the express purpose of targeting LGBTQ populations. Advertisements for tobacco products often appear in LGBTQ-targeted newspapers, magazines, and other reading materials and tobacco companies regularly sponsor LGBTQ events such as pride parades, gay film festivals, and HIV/AIDS community outreach events (Stevens, Carlson, & Hinman, 2004). More involvement with these reading materials and these events creates more opportunity to be exposed to tobacco-related advertising, likely influencing tobacco use within the LGBTQ community.

However, previous research also indicates that a sense of connectedness to the LGBTQ community can function as a protective factor against smoking. Johns and colleagues (2013) found that young sexual minority women who were involved in more LGBTQ organizations were more likely to be smokers, but young sexual minority women who expressed a higher degree of connection to the LGBTQ community smoked less frequently than those who expressed a lower degree of connection to the LGBTQ community. These findings seem to indicate that a feeling of connectedness to the LGBTQ community can function as a protective factor against smoking, despite the increased risk for exposure to cigarette use.

Substance Use.

Much like the research on cigarette use, the research on drug and alcohol use indicates that LGBTQ individuals use substances at disproportionately high rates (Meyer, 2003), and these patterns hold true for LGBTQ youth (Marshall et al., 2008). Again, minority stress is implicated as a reason for this disparity (McCabe, Bostwick, Hughes, West, & Boyd, 2010). Regarding the

potential protective factors of LGBTQ community connectedness on substance use, there is not a clear answer. Feinstein, Dyar, and London (2017) found that higher degrees of outness as well as more LGBTQ community involvement were both associated with higher ratings of drug and alcohol abuse for bisexual women, but these patterns did not hold true for lesbian women or women who identified as queer. Conversely, Lelutiu-Weinberger and colleagues (2013) found that identification with the gay community was associated with fewer days of drug use over thirty days among gay and bisexual men. Finally, Rosario, Schrimshaw, and Hunter (2004) found a curvilinear relationship between gay-related activities and substance use for LGBTQ youth such that initial involvement in gay-related social activities was associated with more alcohol and marijuana use, but continued involvement in gay-related social activities was associated with less substance use. These mixed findings seem to indicate that there may be other factors influencing the relationship between substance use and LGBTQ community involvement.

Physical Activity.

Ensuring that people consume healthy, nutritious foods and engage in regular physical activity have been top priorities in global health for decades (Erin, Moser, Oh, Nebeling, & Yaroch, 2012; Evenson et al, 2013). Little research has examined potential differences in diet and exercise behaviors of LGBTQ individuals compared to the general population, but the research that does exist shows a variety of contradictory findings that often differ by specific LGBTQ subgroups (Minnis et al., 2016). Some research has indicated that sexual minority individuals report less physical activity than heterosexual individuals (Conron, Mimiaga, & Landers, 2010) whereas some research suggests LGBTQ individuals engage in more physical activity than heterosexual individuals (Boehmer, Miao, Linkletter, & Clark, 2012). Similarly, a literature review by Rothblum (2014) highlighted results suggesting that lesbian women either

weighed more than heterosexual women, weigh less, or weigh the same and that lesbian women have been found to engage in more, less, or equal amounts of physical activity compared to heterosexual women. Seemingly no research has been conducted on the exercise habits of transgender individuals. The variety of competing results that do exist indicates that more research needs be conducted to explore engagement in physical activity for LGBTQ individuals. Similarly, research needs to be conducted to explore the role community identification may play in engagement in physical activity for LGBTQ individuals.

Sexual Behaviors.

Research on patterns of sexual behavior frequently suggests that LGBTQ individuals engage in risky sexual practices at higher rates than the general population (Robinson & Espelage, 2013; Shilo & Mor, 2014). Sexual minority men, specifically, have a higher likelihood of engaging in sexual risk-taking behaviors than others (Dentato, Halkitis, & Orwat, 2013). Sexual minority women have been found to have a greater overall number of sexual partners, (Marrazzo, Stine, & Wald, 2003), are more likely to engage in unprotected sexual activity (Goodenow, Szalacha, Robin, & Westheimer, 2008), and begin engaging in sexual activity at a younger age (Mercer et al., 2007) than heterosexual women.

Research on sexual behaviors of gender minority individuals is extremely limited, with most of the literature focusing on HIV/AIDS prevalence among transgender women involved in sex work. A meta-analysis of HIV/AIDS risk behaviors among transgender individuals indicated that transgender women report elevated rates of engaging in casual sex, engaging in unprotected sex, and using drugs or alcohol during sexual encounters, but these findings may be confounded by the research on the sexual practices of transgender sex workers (Herbst et al., 2008). The few

studies in Herbst and colleagues' (2008) meta-analysis that focused on transgender men also reported high levels of unprotected sex and drug or alcohol use during sexual encounters.

There are a number of potential factors that may contribute to the prevalence of risky sexual practices among LGBTQ populations. School-based sexual education programs are taught almost exclusively from a heterosexual/cisgender-centric perspective. Because of this, LGBTQ youth may not receive accurate information about safe sexual practices and may not know where to acquire accurate and pertinent information about sex (Gowen & Wings-Yanez, 2014). Additionally, research has indicated a relationship between experiences of minority stress or discrimination and engaging in risky sexual practices (Diaz, Ayala, & Bein, 2004; Hatzenbuehler, Nolen-Hoeksema, & Erickson, 2008).

The research on LGBTQ community identification and sexual risk-taking is mixed. Some existing research suggests that community identification may function as a protective factor against sexual risk-taking (Lelutiu-Weinberger et al., 2013), but other research contradicts this idea by suggesting greater community integration is associated with more sexual risk-taking behavior because greater community integration can provide individuals with the opportunity to meet a greater number of potential sexual partners (Fergus et al., 2005). More research is needed to further understand this relationship.

Utilization of Medical Services/ Medical Adherence.

It has been argued that the disconnect between the LGBTQ community and the medical system is the most prominent risk factor for LGBTQ health, and yet very little research has examined how to fix this problem (Smalley, Warren, & Barefoot, 2016). Rates of seeking medical treatment as well as medical adherence are both low across subgroups of the LGBTQ community, but are especially low among transgender and bisexual individuals. Smalley,

Warren, & Barefoot (2016) found that approximately one third of transgender women and one quarter of transgender men and gender queer participants regularly avoided necessary medical care and between 20% and 23% of transgender participants did not follow received medical advice. Additionally, about 25% of bisexual participants reported regularly avoiding medical care.

Medical providers may need competency training to effectively interact with LGBTQ patients. In a focus group by Alpert, CichoskiKelly, and Fox (2017) LGBTQ participants reported not seeking medical treatment in order to avoid discrimination and embarrassment that stem from lack of comfort and understanding on the part of medical providers. If LGBTQ individuals felt safe and comfortable interacting with medical providers, and medical providers felt confident and knowledgeable when interacting with LGBTQ patients, it could have the potential to drastically improve health outcomes in the LGBTQ community.

There is some research to support the idea that identification with the LGBTQ community has a positive effect on utilization of medical services. Anderson-Carpenter, Sauter, Luiggi-Hernández, & Haight (2018) found that among a sample of gay and bisexual men, connectedness to the LGBTQ community suppressed the negative effect of perceived homophobia on having a consistent health care provider. More research on community identification and utilization of medical services among LGBTQ individuals is needed to see if the idea that greater identification with the LGBTQ community would be related to more utilization of medical services is supported.

Health Outcomes.

Health outcomes such as disease and longevity are affected by health behaviors (Conner & Norman, 2017) as well as biological, psychological, and interpersonal determinates and

individual contextual factors (Lehman, David, & Gruber, 2017). Health outcomes result from a variety of complex relationships to various health behaviors. For example, uncontrolled stress, physical inactivity, and not eating a sufficient amount of nutrient-dense foods have all been found to be associated with cardiovascular disease (Sabzmakan et al., 2014). Much like research on health behaviors, research on health outcomes, particularly in specific communities, is important because information about what types of illnesses are most prevalent among different groups of people can inform the development of treatments. Additionally, this information can lead to more specific public policies regarding medical services. The following sections will examine the existing literature on health outcomes pertinent to LGBTQ populations.

Cardiovascular disease.

Despite a substantial decrease in cardiovascular disease (CVD) related deaths over the last four decades, CVD is the leading cause of death in the United States, (Fang, Yang, Hong, & Loustalot, 2012). Though the rates of CVD are high in the United States, some research seems to indicate that rates of CVD and CVD-related health problems are higher in the LGBTQ community than in the general population. For example, Cochran and Mays (2007) found that gay men reported experiencing hypertension and CVD at higher rates than heterosexual men. Similarly, Diamant and Wold (2003) found that lesbian and bisexual women reported more instances of CVD diagnoses than heterosexual women. Unfortunately, seemingly no research has examined the prevalence of CVD in transgender individuals. Some research has linked the disproportionate rates of CVD among sexual minorities to experiences of stigma and discrimination. Hatzenbuehler, Bellatorre, Lee, Finch, Muennig, and Fiscella (2014) found that CVD related causes of death were significantly elevated among sexual minorities who lived in communities with high levels of anti-gay prejudice.

Though no research on the relationship between CVD and community identification could be found at this time, it stands to reason that community identification could have a positive effect on CVD outcomes for LGBTQ individuals. Existing research on social support shows links between social support and decreased risk for CVD (Uchino, 2004). Additionally, there is research to suggest that available social support, or the feeling that one has the potential to access support from others even in the absence of actual social support, has similar health benefits to actually receiving social support (Cohen, 1988). Available social support has also often been found to be a stronger predictor of well-being than received social support (Cohen & Wills, 1985). Similarly, Uchino and Garvey (1997) found that available social support moderated blood pressure reactivity during an acute psychological stress task, suggesting that simply feeling as though you have access to support if you need it can have beneficial outcomes for heart health. Based on these findings in the general health psychology literature, it is possible that similar results may exist for LGBTQ group identification because the LGBTQ community may function as a form of available social support for LGBTQ individuals.

HIV/AIDS.

The AIDS crisis is arguably one of the most notable and well documented health concerns to affect the LGBTQ community, and the majority of research on LGBTQ health focuses on HIV/AIDS (Snyder, 2001). The devastating impact AIDS has had on gay and bisexual men overall is well documented, but it is important to recognize that the disparity in rates of HIV infection are even more drastic among gay and bisexual men of color. Young Black men who have sex with men experience a higher incidence of new HIV infections, as well as a higher prevalence of HIV overall, than any other group in the United States (Newcomb, Ryan,

Garofalo, & Mustanski, 2015). Latino men who have sex with men also experience disproportionately high rates of HIV infection (Prejean et al., 2011).

Though the high rates of HIV/AIDS in the LGBTQ community are predominately driven by gay and bisexual men, HIV/AIDS is also a serious health concern for transgender individuals, particularly transgender women. The CDC (2015) estimates that approximately one quarter of transgender women are living with HIV and over fifty percent of Black transgender women are living with HIV. These findings indicate that it is important to consider the intersection of multiple stigmatized identities and how they play a role in health disparities among already marginalized populations.

The literature on the relationship between LGBTQ community involvement and HIV outcomes is strikingly sparse given that most LGBTQ health research is centered around HIV/AIDS. There is some research that suggests there is a positive association between LGBTQ community involvement and HIV risk. Namely, frequenting gay bars and clubs is associated with more risk of contracting HIV (Fergus, Lewis, Darbes, & Butterfield, 2005). However, through a conceptual framework for the protective effects of community involvement, Ramirez-Valles (2002) argues that LGBTQ community involvement through participating in HIV/AIDS related organizations can act as a buffer and help prevent the contraction and spread of HIV among gay and bisexual men. The logic behind this argument is that involvement in an organization that directly helps the community with which you identify (e.g. gay and bisexual men) can provide a sense of personal growth and community connection. Additionally, involvement in HIV/AIDS organizations can provide knowledge about HIV prevention practices for volunteers. The relationship between LGBTQ community involvement and HIV is complicated and warrants further exploration.

Cancer.

Due to the lack of population-based data on cancer prevalence in the LGBTQ community, it is difficult to pinpoint sexual and gender minority-based disparities in cancer incidence and prevalence (Bowen & Boehmer, 2007). However, there is some evidence to suggest that certain types of cancer may affect particular LGBTQ subgroups more than others. LGBTQ individuals, particularly gay and bisexual men, are at an increased risk of contracting human papillomavirus (HPV) and HPV-related cancers, including anal, genital, and oropharyngeal cancers (Poynten, 2015). A number of factors could be contributing to increased rates of HPV and HPV-related cancers among gay and bisexual men. For example, the practice of serosorting, or choosing particular sexual partners or only engaging in particular sexual acts based on a partner's HIV status, is a common practice among men who have sex with men. However, condoms are not always used during serosorting, because contracting HIV is less of a concern (Purcell, Higa, Mizuno, & Lyles, 2017). This practice can put men who have sex with men at risk for contracting other sexually transmitted infections, the most common of which is HPV (CDC, 2017).

Similarly, lesbian and bisexual women may be at an increased risk for breast cancer and cervical cancer, (Boehmer, Miao, & Ozonoff, 2011; Poynten, 2015) but more research needs to be done in this area. A potential contributing factor to these proposed disparities is that sexual minority women are less likely to undergo medical examinations like breast exams and cervical screenings than are heterosexual women (Poynten, 2015).

Research on cancer rates among transgender individuals is severely limited. Research on transgender individuals' engagement with cancer screening indicates that transgender men who retain reproductive organs such as a cervix and ovaries, are less likely to access preventative

cancer screenings of their natal reproductive structures than are cisgender women (Peitzmeier, Khullar, Reisner, & Potter, 2014).

Research on the influence of LGBTQ community identification on cancer outcomes is minimal, but there is evidence to suggest that there may be a relationship between the two. Boehmer and colleagues (2005) found that women who self-identified as lesbian or bisexual had better outcomes after a cancer diagnosis than women who reported being sexually or romantically involved with women but did not identify as lesbian or bisexual. It is possible that identifying with the LGBTQ community can provide a source of resilience for LGBTQ individuals undergoing cancer treatment.

Stress Responses.

Chronic stress can negatively affect health outcomes, such as blood pressure, immune functioning, and endocrine responses, as well as health behaviors, such as substance use, exercise, and sleep (Taylor, 2015). Experiencing discrimination and prejudice has been implicated as a stressor that can contribute to poorer health and increased mortality (Busse, Yim, Campos, & Marshburn, 2017). Busse, Yim, Campos, and Marshburn's meta-analysis of discrimination and stress responses suggests that experiencing discrimination is associated with alterations in hypothalamic-pituitary-adrenal (HPA) axis activity, meaning that experiencing discrimination is associated with dysregulated stress responses. In one of the few studies looking at HPA axis reactivity in lesbian, gay, and bisexual individuals, Hatzenbuehler and McLaughlin (2014) found that sexual minority young adults who lived in states with high levels of LGBTQ stigma showed blunted cortisol responses following a laboratory stress task compared to sexual minority individuals who lived in states with low levels of LGBTQ stigma. This suggests that

exposure to high levels of structural stigma has the capability to alter subsequent HPA axis reactivity for individuals who belong to marginalized groups.

Similarly, Parra, Benigui, Helm, and Hastings (2016) found experiences of sexual identity-related prejudice were associated with higher and flatter circulating levels of diurnal cortisol, which is a marker of HPA axis dysregulation. Though research on stress responses in transgender individuals is even more limited, similar results have been found. In a study on stigma and diurnal cortisol activity in transitioning transgender men, DuBois, Powers, Everett, and Juster (2017) found that transition-related stressors were associated with elevated diurnal cortisol concentrations and amplified HPA axis activation upon awakening. Taken together, the findings from these studies provide support for the idea that minority stress can have negative consequences for the health of LGBTQ individuals.

There is some evidence to suggest that identification with the LGBTQ community can help to buffer heightened stress responses. Juster, Smith, Ouellet, Sindi, & Lupien (2013) found that lesbian, gay, and bisexual individuals who had disclosed their sexual orientation to their family and friends had lower diurnal cortisol concentrations than lesbian, gay, and bisexual individuals who had not disclosed their sexual orientation to loved ones. Further exploration of the relationship between LGBTQ community identification and stress responses is needed to see whether similar patterns exist for forms of LGBTQ community identification other than the traditional coming out paradigm. Similarly, it is important to see if these patterns hold true for other sexual and gender minority individuals.

Conclusions from a review of LGBTQ Health Literature.

There are two main takeaways from the existing literature on LGBTQ health behaviors and health outcomes. The first is that there are a number of glaring gaps in the available research

on LGBTQ health. Perhaps the most notable is the paucity of research on transgender health. Though the LGBTQ community is comprised of both sexual minority individuals and gender minority individuals, categorizing sexual and gender minority individuals in the same way in research does a disservice to both sexual and gender minorities. It is necessary for researchers to be more inclusive and more specific about the samples taking part in research. Similarly, the majority of research conducted on sexual minorities centers the experiences of gay and bisexual men, leaving sexual minority women underrepresented and underserved in the area of LGBTQ health research.

The second takeaway is that stigma and minority stress can greatly, negatively affect the health and well-being of LGBTQ individuals. However, there are some discrepancies in the literature. Though minority stress is detrimental to health, there are some studies that seem to suggest that LGBTQ individuals are able to overcome these negative effects of minority stress, resulting in more positive health outcomes and behaviors. Similarly, there is some indication that identification with the LGBTQ community has an influence on the health outcomes and health behaviors of LGBTQ individuals. Exploring the role of community resilience may be a key factor in understanding why these conflicting outcomes exist for individuals in the LGBTQ community.

Resilience

Resilience is a construct that has been difficult to define, and despite a large body of research on the topic, one clear operational definition does not exist (Luthar, Cicchetti, & Becker, 2000). Research in the area of positive psychology posits that resilience can be fostered in the face of hardship (Seligman & Csikszentmihalyi, 2000). For the purpose of this paper,

resilience will be conceptualized as personal and community factors that contribute to a person's ability to adapt to, and even thrive in, challenging or traumatic situations (Luthar, 2006).

Research has shown that resilience is correlated with a number of positive health behaviors and outcomes. In the general population, greater resilience predicts less substance abuse, (Wingo, Ressler, & Bradley, 2014), better recovery outcomes from heart disease (Chan, Lai, & Wong, 2006), more successful smoking cessation and abstinence (Tsourtos, et al., 2011), and a variety of other health behaviors and outcomes.

Although resilience has many positive outcomes, the relationship between resilience and adversity is complicated. Adversity negatively effects those who experience it, but adversity is required to experience resilience. Seery (2011) posits that experiencing some lifetime adversity, compared to high lifetime adversity or no adversity, can be associated with greater well-being and less distress. This is because experiencing an adverse event, followed by adequate recovery time, can provide an opportunity for individuals to experience toughness, and subsequently, resilience. At what point do the positive health outcomes of resilience outweigh the negative health outcomes of adversity related to a marginalized identity? Because of the disparities in previous research on LGBTQ health, this question is particularly important when considering health outcomes and health behaviors of LGBTQ individuals.

Minority Coping

The concept of minority coping provides one possible explanation for the apparent inconsistencies in research findings on LGBTQ health. Meyer (2003) first described minority coping within the framework of the minority stress model. Meyer proposes that despite identity-related stressors, in addition to regular daily stressors, LGBTQ individuals can experience resilience through what he refers to as minority coping (Meyer, 2003). Minority coping is based

on the idea that although having a minority status can make an individual more vulnerable to stress, it can also provide an individual with a sense of community and group solidarity that can lead to resilience, and function as a protective factor against the stress of being an individual with a minority identity.

According to Meyer (2015) minority coping includes both individual resilience and the overall ability of a community to cope with adversity. Community resilience is derived from the social, emotional, and physical resources available through personally identifying with a particular community. Although both individual resilience and community resilience contribute to minority coping, Meyer emphasizes the importance of community resilience for LGBTQ individuals. Specifically, having a strong sense of identity and connection with the LGBTQ community can help protect against identity-related stigma and discrimination (Meyer, 2015). Through community resilience, individuals can draw upon both tangible and intangible community resources in times of need. Tangible resources, such as LGBTQ community centers and LGBTQ-friendly health clinics, provide supports, services, and physical spaces that can better the lives of LGBTQ individuals. Intangible resources, such as community values that affirm the legitimacy of the LGBTQ experience, can give individuals the sense that they are not alone and that they have a shared experience with other people like themselves. A sense of belonging, or feeling involved and connected with a particular group or community (Hagerty, Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992), is often described as a fundamental human need (Baumeister & Leary, 1995) that is required for healthy social and psychological functioning (Hagerty, Williams, Coyne, & Early, 1996).

Community Resilience

In the general population, community resilience predicts positive health outcomes and behaviors. Williams, Spencer, and Jackson (1999) found that Black participants who had a stronger racial self-concept had a weaker negative association between experiences of discrimination and self-reported physical health. Similarly, Çelebi, Verkuyten, and Bagci (2017) found that for a group of Syrian refugees in Turkey, higher rates of perceived ethnicity-based discrimination were associated with worse health, but not for those who derived a sense of meaningfulness, control, and distinctiveness from their Syrian identity. These findings suggest that identifying with one's community may reduce the negative health consequences of discrimination and promote more positive health outcomes.

Traditionally, communities have been thought of as being geographically dependent. Neighborhoods and cities are common examples of communities. However, technological advances and increases in globalization have made it so communities no longer need to be limited by geography (Hidalgo & Hernandez, 2001; Riger & Lavrakas, 1981). Now communities can be formed on the basis of social identities and shared experiences (MacQueen et al., 2001). Previous research has shown that the physical and psychological benefits derived from connecting with one's geographical community actually come from the sense of belonging to a broader social network and have very little to do with the specific location (Gattino, De Piccoli, Fassio, & Rollero, 2013). In regard to the LGBTQ community, it is important to consider the benefits of communities that are not geographically bound. For LGBTQ individuals who are part of broader communities where connecting with other LGBTQ individuals is inaccessible, such as rural areas (Poon, & Saewyc, 2009) or religious communities (Wolff, Himes, Soares, & Kwon, 2016), seeking support and connection from other LGBTQ individuals in different areas may be the only way to connect with the LGBTQ community (Driver, 2006).

Though little research has examined the causes of community resilience, Bonanno, Romero, and Klein (2015) posit that one of the biggest potential predictors of community resilience is the community's social capital. Social capital encompasses concepts such as the social relationships, sense of community, collective efficacy, or the ability of community members to create a safe and welcoming environment, civic participation, and mutual help and reciprocity experienced by members of specific communities. Previous research has indicated that the social capital of a community is related to health outcomes of individuals within that community. For example, indicators of community social capital, such as sense of belonging, community trust, and sense of reciprocity, have been linked to less severe depression (Fowler, Wareham-Fowler, & Barnes, 2013), less recurrence of acute coronary syndrome among individuals from low SES communities (Scheffler, Brown, Syme, Kawachi, Tolstykh, & Iribarren, 2008) decreased adolescent risk taking (Magson, Craven, Munns, & Yeung, 2016), and lower mortality rates (Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997), for community members.

The concepts of social capital and minority coping are similar in that they both emphasize the importance of group identification and community connectedness in fostering resilience. Although greater identification with an LGBTQ identity can lead to greater vulnerability to identity related stressors, an LGBTQ identity can also afford more opportunities for accessing community resources and taking advantage of minority coping by affiliating with the LGBTQ community (Meyer, 2015). However, some community resources can benefit LGBTQ individuals who do not disclose their identity to others. For example, viewing positive media representations of LGBTQ individuals is associated with resilience in LGBTQ youth (Craig, McInroy, McCreedy, & Alaggia, 2014). Merely being exposed to an LGBTQ television character

does not require any form of personal identification with the LGBTQ community, but many LGBTQ activists have fought for more positive representation of LGBTQ individuals in mainstream media, and an LGBTQ individual who views an LGBTQ character in a movie or television show may benefit from the efforts of those activists. However, many community resources necessitate some form of personal identification with the community to benefit. Because of this, identification with the LGBTQ community in some way, likely affords LGBTQ individuals the most benefit from community resilience.

Group Identification

The concept of group identity has been explored through Tajfel and Turner's (1979) theory of social identity. Social identity theory posits that people's sense of self can be partially derived from their social group membership. Three main processes of social identity theory are especially important for identifying with one's group. First, individuals must identify with their particular ingroup and integrate their membership with that group into their self-concepts. Second, individuals must be able to distinguish their particular group from, and compare it to, different social groups. Third, individuals must perceive the other social group, or groups, as relevant to their ingroup. This means that individuals must consider themselves to be part of a particular group and consider their group to be different from other socially relevant groups in order to experience a sense of collective self-esteem. Collective self-esteem (Crocker & Luhtanen, 1990) is the desire to maintain a positive social identity that leads people to make favorable comparisons between their ingroup and other outgroups. An example of this could be that a lesbian woman considers herself to be a member of the LGBTQ community, which she considers to be distinct from the heterosexual/cisgender community, and therefore, she garners a sense of collective self-esteem from that group identification. Tajfel and Turner's (1979) social

identity theory shares many of the same characteristics as Meyer's (2015) theory of minority coping. Both theories emphasize the importance of group identification for reaping the benefits (collective self-esteem or community resilience) of one's social community. However, the question of how individuals must choose to identify with their communities in order to gain these benefits is not clear.

When discussing the concept of identity within the LGBTQ community, it is vital to consider the unique position of LGBTQ individuals. Unlike other stigmatized groups, such as racial and ethnic minority individuals, LGBTQ individuals may be able to conceal an LGBTQ identity and may decide whether to disclose information about their sexual orientation and gender identity, how much information to disclose, and to whom they will disclose. Early research on social stigma suggests that though we require regular interaction with others to fully develop our own self-concept, this process may be particularly difficult for individuals with stigmatized identities (Jones et al., 1984). The desire to conceal a part of one's identity that may lead to discrimination from others is in conflict with the desire to connect with others and develop a healthy self-concept. Because LGBTQ individuals must make a decision to disclose a sexual or gender minority identity, rather than this information being made immediately apparent to others through some identifiable characteristic, LGBTQ individuals may use a number of different ways to express their LGBTQ identity. As such, I suggest that there are a variety of ways LGBTQ individuals can identify with the broader LGBTQ community and experience the benefits of collective self-esteem or community resilience.

LGBTQ Identity

Open disclosure of an LGBTQ identity, or "coming out of the closet" is often considered to be a common, possibly even necessary, step to take in order to openly identify as a member of

the LGBTQ community (Cass, 1984). Adams (2010) argues that coming out is a necessary step for LGBTQ individuals because unlike other identifiers of marginalized identities like race or physical disability, an LGBTQ identity is not necessarily visible. The process of developing an LGBTQ identity is often described in terms of Cass's (1984) six-stage model of homosexual identity formation, however, this model was conceptualized specifically for the identity formation process experiences among gay men and lesbian women. The stages of this model are identity confusion, identity comparison, identity tolerance, identity acceptance, identity pride, and identity synthesis. The *identity confusion* stage occurs when the individual begins to interpret some of their thoughts, feelings, or actions as being consistent with those of a gay individual. In the *identity comparison* stage, the individual has accepted that they have the potential to have a gay identity and begin comparing their thoughts, feelings, and actions to those of heterosexual people to see where they differ. In the *identity tolerance* stage, the individual is becoming more comfortable with the idea of being gay and begins to seek out other gay people for friendship, romance, and social support. In the *identity acceptance* stage, the individual is immersed in gay culture, has developed a positive view of gay identity, and has a strong and supportive network of gay friends. In the *identity pride* stage, the individual is proud of the gay identity they have and proud of the gay community in general. In this stage, the individual begins to disclose their gay identity to others in order to promote the validity and visibility of gay people. Finally, in the *identity synthesis* stage, the individual begins to view their gay identity as just one of the many facets of who they are. They become comfortable enough with themselves that identity disclosure is no longer an issue and they are able to fully integrate their gay identity into their self-concept, completing the identity formation process.

According to Cass, to achieve full integration and self-acceptance of a gay identity, an individual must grapple with their identity, regularly interact with other sexual or gender minority individuals, and express their own minority identity so that it is no longer hidden. However, a paradox exists because for many LGBTQ individuals, the process of identity disclosure by merging public and private identification is not an option due to concerns for personal safety or fear of rejection and alienation from unsupportive others. Additionally, many researchers have critiqued a “one size fits all” approach to the coming out paradigm, highlighting that different processes often occur based on characteristics such as gender (Diamond, 2006), race and ethnicity (Parks, Hughes, & Matthews, 2004), LGBTQ subgroup (Diamond, 2006), and age (Hammack, Thompson, & Pilecki, 2009). Because of these apparent nuances in how individuals choose to take ownership of an LGBTQ identity, research suggests that many LGBTQ individuals chose to express their sexual and gender identities and connect with the LGBTQ community in other ways.

Selective identity disclosure.

The process of identity disclosure is more nuanced for some LGBTQ individuals than for others. For example, for bisexual individuals, the process of disclosing a bisexual orientation can be a challenging and confusing process due to the continuing stigma surrounding bisexuality in both the LGBTQ community, as well as the broader heterosexual culture (Matsick & Rubin, 2018). Additionally, a bisexual person with a romantic partner of a different gender is often assumed to be straight, requiring the bisexual person to be much more explicit if they wish to disclose their sexual orientation to others. Because of these issues, many bisexual people choose to only disclose their bisexual identity to a select few and are less likely to discuss their sexual

orientation with friends, family, or medical providers than are other sexual minorities (McLean, 2007).

Additionally, transgender individuals are often faced with a difficult choice when it comes to disclosing a gender minority identity. Many transgender people experience pressure to fully live in accordance with the gender with which they identify, with the goal of being able to appear or “pass” as a cisgender person. As a result, many transgender individuals feel as though disclosure of a transgender identity undermines and discredits their gender identity (Rood et al., 2017) and may choose to only disclose their transgender identity to a select few.

Finally, regardless of the specific identity, for many LGBTQ individuals, disclosure is contingent on a number of context-specific factors such as fear for physical and emotional safety and perceived level of social support (Klein, Holtby, Cook, & Travers, 2015). As a result, many LGBTQ individuals engage in strategic identity management, which involves deciding when to disclose and when to conceal one’s sexual or gender minority identity (Schmitz & Tyler, 2018). Interestingly, strategic identity management can actually be empowering, rather than stifling to the person deciding whether to disclose their identity to another person. Schmitz and Tyler found that LGBTQ youth used strategic identity management as a way to assert their autonomy and personal agency by deciding who in their lives had the privilege of knowing about their minority identity.

Online disclosure.

For many individuals who do not feel comfortable openly expressing their marginalized identity, the internet provides a space where one can connect with other LGBTQ individuals and foster a sense of community with little fear of harm or rejection (McKenna & Bargh, 1998). Due to the concealable nature of an LGBTQ identity, it can be difficult for LGBTQ individuals to

find others who share a similar sexual orientation or gender identity in their daily life. The internet provides a space where people can easily find websites, forums, chat rooms, and social media platforms dedicated to connecting LGBTQ individuals with each other. Miller (2016) found that LGBTQ forums function as spaces where users can gain a sense of community and comradery; experience validation that one's identity is normal; and receive advice and information on issues such as coming out to others, dealing with harassment, and engaging in sexual activity as an LGBTQ person. The internet also provides a space where individuals grappling with their identity can "try out" different identity labels and expressions while trying to find the labels that feel most appropriate. Craig and McInroy (2014) found that LGBTQ youth regularly use the internet as a way to explore identity labels and come out to others in a way that they consider to be fairly low risk.

Participation in Queer Spaces.

Queer spaces, such as gay bars, pride parades, and other gatherings, provide spaces where individuals are free to express non-normative practices regarding gender, sexuality, and identity expression (Stone, 2013). Though queer spaces can be tied to a particular physical location, this is not required. For example, when interviewing gay and lesbian military service members about their experiences serving under the Don't Ask/Don't Tell law, Trivette (2010) discovered that many individuals were involved in what is referred to as the Gay Underground Network. These networks provided LGBTQ service members with a way to get around the law and connect with other LGBTQ service members for support without needing to openly express their LGBTQ identities to others who may not be as supportive.

Additionally, Queer-Straight Alliances (QSAs) provide safe and supportive environments for LGBTQ and questioning youth to explore their identities, as well as participate in leadership

and activism opportunities (Asakura, 2010). For many students who do not fit in at their schools, QSAs may be one of the few spaces where they can have positive peer interactions. QSAs may protect LGBTQ youth against a variety of physical and psychological threats (Asakura, 2010).

Finally, gay and lesbian bars provide comfortable, often secret, places for LGBTQ people to meet other LGBTQ people and their allies. Even geographical areas that hold high levels of structural stigma against the LGBTQ community have thriving gay bars, though many of these bars exist in secret. These bars are often nondescript on the outside and advertise through private social media pages or word of mouth, to ensure safety and secrecy for their patrons (Croff, Hubach, Currin, & Fredrick, 2017). For LGBTQ individuals who are not out, these spaces provide supportive environments for them to fully express themselves without fear of harm or ridicule. Adams (2010) argues that in the broader community, people are considered to be straight until proven gay, but that queer spaces invert this assumption. Because of this, queer spaces allow LGBTQ individuals the opportunity to participate in queer-centric activities without needing to explicitly come out as an LGBTQ person.

Living in Queer Communities.

Living in and frequenting gay neighborhoods (historically referred to as gay ghettos, but this term has a negative connotation and is not frequently used anymore) is one way to garner community support by immersing one's self in LGBTQ culture. There is not one specific definition of what constitutes as a gay neighborhood, but gay neighborhoods typically consist of particular sections of cities where businesses, living spaces, and social events and community activities are largely occupied by LGBTQ individuals; historically gay men (LeVay & Nonas, 1995). These neighborhoods and living communities may be especially attractive to LGBTQ individuals because of the sense of community connectedness that can be gained from these

spaces. Compton and Baumle (2012) found that the main reasons gay men and lesbian women reported choosing to live in gay neighborhoods were the sense of community derived from the presence of other LGBTQ individuals and the accepting and liberal political climate that occurs in these spaces. However, there is a disparity in the LGBTQ community regarding who has access to these particular spaces. Gay neighborhoods are most frequently located in large urban cities and tend to be dominated by middle class, white, gay men (LeVay & Nonas, 1995). Due to issues regarding race, gender identity, and socioeconomic status, these neighborhoods may be more welcoming to some members of the LGBTQ community than to others.

Appearance.

Physical appearance has historically been used as a covert way for LGBTQ individuals to express their identity to other LGBTQ individuals and is still a widely used method of nonverbal identity expression (Clarke, 2013). Elements such as clothing, hairstyles, and makeup can all be used to express identification with the LGBTQ community (Clarke & Turner, 2007). Though associating particular stylistic choices with an LGBTQ identity can lead to inaccurate stereotypes (e.g. all lesbians have short hair and all men who wear the color pink are gay), researchers and historians have found that LGBTQ people use appearance to provide coded hints of one's LGBTQ identity and to find similar others (Holliday, 2001).

Through these methods of identifying with the LGBTQ community, LGBTQ individuals are able to connect with their sexual and gender identities, even if overt disclosure and identity integration proposed by Cass's (1984) model are not viable options. These alternative methods of identification afford LGBTQ people the opportunity to receive the benefits of community resilience regardless of whether they are "out" in the traditional sense. In the present study, I will

be using a broad definition of community identification in order to account for the numerous ways that LGBTQ individuals can choose to identify with the LGBTQ community.

Current Study

The current study explores the relationship between LGBTQ community identification and indicators of physical health within the framework of community resilience. I propose that for LGBTQ individuals, some form of identification with the LGBTQ community, either overt or covert, will be associated with more positive health outcomes and better health behaviors. I examined the possibility for LGBTQ people to reap the benefits of community resilience, even if they are not expressing their LGBTQ identity in a way that follows a conventional coming out model. I explored whether a variety of different forms of identification with the LGBTQ community could be positively associated with positive health outcomes and behaviors. In order to explore these ideas, I conducted meta-analyses of previously existing LGBTQ health research.

Meta-Analysis

The purpose of a meta-analysis is to summarize and integrate results across a range of available empirical studies in order to reach a meaningful conclusion about the direction and magnitude of effects across studies (Lipsey & Wilson, 2001). This particular study utilized meta-analytic techniques to explore the potential relationship between LGBTQ community identification and indicators of physical health. When possible, important moderators of this association, including age, race, sexual orientation, publication year, type of community identification, and measurement quality were tested. Because empirical studies are sparse, it was not anticipated that it would be possible to analyze all of these factors. Meta-analytic techniques could provide insight into the inconsistent results in the literature regarding LGBTQ health outcomes and health behaviors.

Method

Selection of Studies

The meta-analyses were limited to data from studies conducted in English that include an LGBTQ sample, a measure of LGBTQ community identification, and a measure of physical health. These selection criteria resulted in a final sample of 32 studies. Twelve thousand one hundred and ninety-nine article abstracts were identified and screened using the predefined search criteria. Articles were screened by the primary investigator and a team of three undergraduate research assistants. Through the screening process, 11,922 articles were excluded for not meeting the inclusion criteria for this study. The remaining 277 full-text articles were assessed for eligibility. Two hundred and twelve articles were excluded for lack of relevance and 33 duplicate articles were excluded, leaving 32 articles to be included in the present study. A consort diagram of the study selection process can be found in Figure 1.

To identify relevant studies for inclusion in the meta-analyses, computerized searches were performed using PsycINFO, PubMed, MEDLINE, ProQuest, Sociological Abstracts, and Google Scholar. The list of keywords and search terms regarding LGBTQ community identification and physical health is shown in Appendix A and were used to search these databases. As described later, methods such as sending requests for published or unpublished research to listservs, reading doctoral dissertations, and directly contacting relevant researchers who have publications and articles on related topics were also utilized with the intent of helping to find data that have not been published or were missed through the search terms. Appendix B shows a list of outreach approaches.

Coded Variables

Each study had to first meet the eligibility criteria to be included in these meta-analyses. Each study needed to indicate that the data were derived from an LGBTQ sample, needed to include at least one measure of LGBTQ community identification, and needed to include at least one measure of some indicator of physical health. Studies that met the inclusion criteria were coded to assess characteristics of the participants, measures of LGBTQ community identification, measures of health, and quality of the measurements used. The coding manual that was used for this process can be found in Appendix C.

Participant/sample characteristics.

First, eligible studies identified that the sample in the study was comprised of LGBTQ individuals. Ideally, there was a measure or a question included that provided participants with a way to express personal identification as an LGBTQ individual. An example of this could be a question asking participants to report their sexual orientation and gender identity. However, studies where the researcher specified that data were collected from a sample of LGBTQ individuals were also included, even if there was not a specific measure or question asking participants how they personally identify. An example of this could be data that were collected at an LGBTQ-specific community center. Both types of data were included and coded for LGBTQ sample measurement quality. For each study, the sample size, sexual orientation, and gender identity composition of participants were coded, as well as a variety of other demographic characteristics, if provided. The initial list of intended moderators included age, race, sexual orientation, gender identity, socioeconomic status, relationship status, and location of data collection. As shown in Appendix C, percent breakdowns of each relevant characteristic were recorded as part of the coding process. If the data provided enough information regarding these variables, they were coded and potentially tested as moderators. During the coding process, it

became clear that there would not be enough information on socioeconomic status, relationship status, or location of data collection to code these variables, so they were omitted as potential moderators for the study.

Age.

Because LGBTQ identifying individuals make up a small portion of the general population, LGBTQ research is often conducted using participants from a wide variety of age groups, rather than the college student samples often utilized in many areas of psychology. Because of this, there was an attempt to identify observable differences in the effect between different age groups. In each of the four meta-analytic models, the average age of participants in each study was centered around the mean and explored as a continuous moderator.

Race.

Much like other areas of research, the majority of research addressing LGBTQ issues is conducted with predominantly White samples. However, research addressing intersectionality in the LGBTQ community is not uncommon, and as such, I expected to find data collected from LGBTQ participants of color. Each sample utilized in this study was coded for the percent breakdown of race represented in the sample. The possible categories included were White/ European American, Black/ African American, Latinx/ Hispanic, Asian/ Asian American, and Another Race not Previously Listed. More racial identities were coded prior to analyses in an attempt to measure specificity in racial identity, but all other racial identities were collapsed into the category of Another Race Not Previously Listed because there was not enough variability in other racial identities to be able to perform moderator analyses. In each of the four meta-analytic models, the average percentages of participants in each study who self-identified as each of the

available racial identities were centered around the mean and explored as a continuous moderator.

Sexual Orientation.

It is important to code the percentage of each sexual orientation represented within each sample in order to see if the relationship between LGBTQ community identification and indicators of physical health differs based on sexual orientation. Initially, all percentages of sexual orientations reported in each study was recorded. For ease of analysis, percent sexual orientation was later categorized as gay/lesbian or bisexual/pansexual/queer. Because so many study samples consisted of large percentages of gay men, any sexual orientation that was not explicitly stated as gay or lesbian was coded as bisexual/pansexual/queer.

Transgender Identity.

It is important to code the percentage of transgender identities represented within each sample in order to see if the relationship between LGBTQ community identification and indicators of physical health differs for transgender and cisgender individuals. Samples were initially coded for cisgender participants, transgender participants, and unspecified participants. An example of unspecified participants would be a study saying the sample consisted of 60% women and 40% men, without specifying if the participants were cisgender or transgender. Any percentage of participants that were coded as unspecified were later recoded as cisgender for ease of analysis.

Indicators of physical health.

Indicators of physical health were initially coded as either health outcomes or as health behaviors. Measures of **health outcomes** are defined as any measure that directly captures the state of a person's physical health. Examples of health outcomes that were used in the literature

review section of this paper are cardiovascular disease, HIV/AIDS, cancer, and stress responses. Measures of **health behaviors** are defined as any measure that directly captures behaviors taken that contribute to or detract from a person's physical health. Examples of health behaviors that were used in the literature review section of this paper are smoking, substance use, physical activity, sexual behaviors, and utilization of medical services/ medical adherence. These broad characterizations of health outcomes and health behaviors were used to account for the wide variety of health indicators that may be related to community identification. These indicators were used to guide the initial literature searches for health outcomes and health behaviors, but the categories were edited as studies were coded. The final categories into which indicators of physical health were coded were substance use, sexual behavior, health status, and utilization of health services. These four health categories served as the outcome variables for each of the meta-analytic models. Additionally, physical health indicators were coded to distinguish self-reported health characteristics from physiological health measures. This allowed for an attempt to assess the measurement quality of physical health measures.

Characteristics of LGBTQ community identification.

Much like the indicators of physical health, the specific characteristics of the LGBTQ identification measures were more fully developed after preliminary data were collected. A broad definition of LGBTQ identification was initially used to capture the variety of unique ways individuals may choose to identify with the broader LGBTQ community. Once more identifiable patterns of types of community identification emerged, the conceptualizations of LGBTQ community codes were modified to more appropriately map on to the conceptualizations used in existing literature. Initially, selected studies must have included a measure assessing the ways participants can take actions or express feelings that indicate a sense

of connection with the LGBTQ community. Examples of this may include measures of involvement in LGBTQ online communities or participation in LGBTQ pride parades and celebrations. These measurements can also assess connection to the LGBTQ community that does not involve specific, visible action. For example, this could be a measure of participants' sense of belonging in the broader LGBTQ community. The final categories into which characteristics of LGBTQ community identification were coded was Feelings, Actions, and Both Feelings and Actions. Feelings refers to a measure intended to capture participants' personal sense of connection to, or identification with, the LGBTQ community, but does not measure physical involvement or participation. This could include a measure that explores sense of belonging within the LGBTQ community. Actions refers to a measure intended to capture physical actions or behaviors participants engage in that demonstrate identification with the LGBTQ community. This could include a measure that assesses frequency of attendance at various LGBTQ-specific events. Both Feelings and Actions refers to a measure that addresses both feelings of connectedness to the LGBTQ community and actions that demonstrate identification with the LGBTQ community. The type of community identification measure was dummy coded, with feelings of connectedness used as the reference category. The two dummy coded variables (actions and both feelings and actions) were entered simultaneously as moderators in all four analyses.

Measurement quality.

One important factor for the present study is the quality and specificity of study measurements. Data were coded for quality of measurements used by examining the number of items included in each measurement and whether the measurements used have been validated and utilized in existing literature. Because the amount of usable data for the current project was

fairly small, I treated measurement quality as another variable to code rather than an exclusion criterion. This prevented the exclusion of lower quality measures from making the sample size unnecessarily small. As shown in Appendix C, the quality of the identification of the LGBTQ sample, quality of the measurement of physical health, and quality of the measurement of LGBTQ community identification were assessed and coded separately.

Quality of the assessment of an LGBTQ sample.

To avoid excluding studies that include participants who may be behaviorally gay or bisexual but do not identify as LGBTQ, I coded the quality of the assessment for LGBTQ sample identification. This allowed me to distinguish research that explicitly addresses sexual orientation and gender identity, from research that does not. For example, data that distinguished lesbian/gay participants from bisexual/pansexual participants would be considered to have a higher quality of the assessment for LGBTQ identification than data that categorize bisexual/pansexual participants in the same demographic category as lesbian/gay participants. LGBTQ sample measurement quality was coded on a 5-point scale ranging from 1 (*Researchers indicate data were collected from an LGBTQ sample but do not provide a breakdown of the sample by sexual orientation and/or gender identity*) to 5 (*Participants indicate sexual orientation/gender identity by responding to a non-demographic measure. This may include a fill in the blank question, a single item measure, or an established measure of sexual orientation/gender identity such as the Kinsey Scale or the Klein Grid*). Quality of the assessment of an LGBTQ sample was treated as a continuous variable.

Quality of the assessment of physical health.

Because physical health is conceptualized so broadly in the present study, physical health was assessed in a variety of ways in the data. It was important to code measurement

quality of assessments of physical health because I expected there to be a large disparity in the measurement quality of this particular variable. For example, physiological measures of health were coded as having a higher measurement quality than self-report measures of health. Physical health measurement quality was coded on a 5-point scale ranging from 1 (*This measure was a subjective report of physical health provided by the participant*) to 5 (*This was a physiological measure assessing the participant's health. This could be a sample of biological matter such as saliva, urine or blood; a physiological measure such as heart rate or blood pressure; or some other physical measure taken by the researchers for the purpose of this study*). Quality of the assessment of physical health was treated as a continuous variable.

Quality of the assessment of LGBTQ community identification.

Each study was coded for how reports of identification with the LGBTQ community were measured. Data that included a validated measure of LGBTQ community identification, such as the Connectedness to the LGBT Community Scale (Frost & Meyer, 2011), were considered to have higher measurement quality than data with a single item with a yes/no response option that asks participants, “Do you feel connected to the LGBTQ community?” LGBTQ community identification measurement quality was coded on a 5-point scale ranging from 1 (*This measure assessed whether the participant interacted with an LGBTQ bar/parade/website/other LGBTQ specific space*) to 5 (*This measure used multiple items to assess the extent to which the participant identifies with, or feels connected to the LGBTQ community and is a validated measure that has been used in previous literature*). Quality of the assessment of LGBTQ community identification was treated as a continuous variable.

Extrapolating and Calculating Effect Sizes

Correlations were used to estimate effect sizes for this study. Correlations were chosen because they are the most appropriate way to observe the relationship between the two primary, and often continuous, variables of interest. Correlations were calculated based on the type of variables that were used in each dataset (e.g. continuous variables, dichotomous variables, etc.). Regardless of the coding in the original study, the effect sizes for the relationship between LGBTQ community identification and physical health were calculated so a positive value represents a positive relationship between LGBTQ community identification and better physical health (i.e. stronger or more frequent identification with the LGBTQ community would be associated with more positive indicators of physical health).

Effect Size Protocol

The following protocol for calculating effect sizes helped to maximize the number of eligible studies. Step 1) Whenever possible, effect sizes were extrapolated using a correlation matrix or bivariate correlations provided in each article. Step 2) If a correlation matrix or bivariate correlations were not provided, I attempted to calculate effect sizes from the information provided using inferential and descriptive statistics by utilizing David Wilson's Effect Size Determination Program cited in *Practical Meta-Analysis* (Lipsey & Wilson, 2001). Step 3) If effect sizes still could not be extrapolated from the information provided, the authors of the article were contacted by email in an attempt to acquire the appropriate information. The email template can be found in Appendix D. Step 4) If the authors did not respond in two weeks, a follow up email was sent as a last attempt to acquire the appropriate information. Step 5) If the authors of the article did not respond to the follow up email after one week, the article was discarded from my analyses. All exclusions were tracked and included in a consort diagram.

The number of extrapolated effect sizes varied for each study. The number of effect sizes depended on what information was available within each article. When an article contained multiple measures of LGBTQ community identification or multiple measures of indicators of physical health, an effect size was calculated to represent each of the possible relationships among the variables of interest.

Data Analysis

For each study and data set I worked with, I extracted an effect size that indicated the association between identification with the LGBTQ community and each provided indicator of physical health. I used Pearson's correlation coefficient as the effect size. For ease of interpretation, all effect sizes were coded such that a positive value indicates that LGBTQ community identification is associated with healthier indicators of physical health and a negative value indicates that LGBTQ community identification is associated with more unhealthy indicators of physical health. Each effect size was transformed using Fisher's Z_r – transformation in order to put the correlations in an appropriate form for aggregation. Aggregated results and their confidence intervals were transformed back into Pearson's r prior to reporting in this paper.

A variety of different indicators of physical health were used in the articles included in this study. Because of this, indicators of physical health were collapsed into four distinct categories for ease of analysis. The four indicators of physical health that were present in this study were substance use, sexual behavior, health status, and utilization of health services.

Most of the articles coded for this study contained multiple indicators of physical health and multiple measures of identification with the LGBTQ community. In order to utilize as much available data as possible, all calculated effect sizes were used in this study. However, utilizing multiple effect sizes from the same study violates the assumption in classical meta-analytic

techniques that effect sizes are independent of each other (Cheung, 2014; Hox, Moerbeek, & van de Schoot, 2018; Lipsey & Wilson, 2001). In order to account for the interdependency of effect sizes used in this study, multilevel meta-analytic techniques were used (Assink & Wibbelink, 2016; Hox et al., 2018; Van den Noortgate, López-López, Marín-Martínez, & Sánchez-Meca, 2013). Multilevel meta-analytic techniques allowed me to include all viable effect sizes in this study by accounting for the hierarchical structure of the data where effect sizes are nested within studies.

Four separate three-level meta-analytic models were used to calculate the overall effect size for each of the indicators of physical health, as well as to perform relevant moderator analyses. Three different sources of variance were modeled using this meta-analytic structure. The sampling variance for the observed effect sizes was modeled at Level 1, the variance between effect sizes calculated from the same study was modeled at Level 2, and the variance between studies was modeled at Level 3. The variance at Level 1 differs across primary studies and is based on sample size. The variance at Level 1 is known and was estimated using the inverse variance weight (Hox et al, 2018). The variances at Level 2 and 3 were estimated using the formula by Cheung (2014) that has been translated into R syntax (Assink & Wibbelink, 2016).

Log-likelihood-ratio tests were used to determine if each full meta-analytic model statistically significantly differed from models that exclude one of the variance parameters. This allowed me to determine if statistically significant variance was present at the second and third levels of each of the models (Assink & Wibbelink, 2016). If the tests indicated variance at Level 2 or Level 3 was statistically significant, then the effect size distributions were found to be heterogeneous between effect sizes within a study at Level 2 and between studies at Level 3.

That heterogeneity indicates the effect sizes cannot be considered good estimates of a common effect size and moderator analyses were needed to potentially explain these effect size differences. One potential issue that may come from performing log-likelihood ratio tests is that if you are working with a small number of effect sizes or if your effect sizes come from a small number of articles, the results of the log-likelihood ratio test may appear to not be statistically significant, even though there is considerable variance present between and within studies. In this case, the results of the log-likelihood ratio tests may be indicating a problem with statistical power rather than with variance. An alternate method for examining heterogeneity is to apply Hunter and Schmidt's (1990) 75% rule. This rule indicates that heterogeneity may be considered substantial enough to proceed with moderator analyses if less than 75% of the total variance in the model can be attributed to sampling variance at Level 1. As elaborated in the sections that follow, I chose to proceed with moderator analyses in each of the four meta-analytic models based on this rule. Table 1 provides the heterogeneity present at Level 1, Level 2, and Level 3 for the overall effect sizes of each of the four health outcomes.

Additionally, identifying moderators can help provide a deeper understanding of the relationship between identification with the LGBTQ community and indicators of physical health. Investigating each potential moderator further can provide a more well-rounded picture of this relationship and create an opportunity to inform future research and interventions designed to improve the health of LGBTQ individuals. Based on previous methods used by Spruit, Assink, van Vugt, van der Put, & Stams (2016), moderator analyses were only performed when different moderator categories were drawn from at least three separate studies. Based on these guidelines, eleven moderators were used in the present study. Table 2 provides the outcomes and characteristics of each moderator used for each health outcome in this study. The moderators at

Level 2 were Type of LGBTQ Identification Measure, Confidence in the Estimate of the Effect Size, Community Identification Measurement Quality, Health Measurement Quality, and LGBTQ Sample Quality. The moderators at Level 3 were Study Publication Year, Participant Age, Transgender Identity, Male Identity, Sexual Orientation, and Race.

Each of the four different multilevel meta-analyses were conducted using a multilevel random effects model in the Metaphor package of R version 3.6.1 (Viechtbauer, 2010). A restricted maximum likelihood estimate was used to estimate all of the model parameters and the Knapp and Hartung (2003) adjustment was used to account for the chance of a Type 1 error in the original calculations available through Metafor (Assink and Wibbelink, 2016). Figures were created to summarize the results based on the moderators of percent of each race represented in the samples, percent of each sexual orientation represented in the samples, and percent of each gender identity represented in the samples. Because the sample consisted of a small number of articles and the demographic percentages vary considerable among each article, it is useful to see descriptively the patterns that are leading to the results that follow. For example, some studies included in these analyses utilize samples that consist of exclusively Latinx participants or transgender participants, while other studies have few to no participants with these demographic characteristics. These figures can provide a visual representation of trends of sample demographics for the included studies. Separate figures are shown for patterns of effect sizes based on sample race (Figure 2), sexual orientation (Figure 3), and gender identity (Figure 4) across all four health outcomes. Demographic information was included in the figures for every race, sexual orientation, and gender identity that made up at least 20% of the sample for each article.

Publication Bias

One of the main goals of conducting meta-analyses is to gain a comprehensive understanding of the relationship between two variables by including effects from all studies that exist on the topic (Lipsey & Wilson, 2001). It is possible that more studies on the topic of interest may have been conducted, but the results were not published, leading to publication bias. A funnel plot was created for each of the four meta-analytic models to visually represent the presence of publication bias. Additionally, a forest plot was created for each of the four meta-analytic models to visually demonstrate the heterogeneity of the effect sizes for each outcome variable. Figures 5 through 8 provide the funnel plots for each of the four outcome variables and Figures 9 through 12 provide the forest plots for each of the four outcome variables.

Results

Data Reduction and Preliminary Analyses

All included articles were published between 2000-2019. Most of the research reported was conducted in the United States ($n = 21$), followed by Canada ($n = 3$), single studies that included samples from multiple countries ($n = 3$), Australia ($n = 2$), China ($n = 1$), The Netherlands ($n = 1$), and unknown countries ($n = 1$). The total sample size across all studies used consisted of 19,400 participants ($M = 606$ per study, $Range = 47 - 2450$). Articles utilized a variety of measures to assess identification with the LGBTQ community and multiple articles used more than one measure. Article and sample descriptives including article author, publication year, sample size, sample sexual orientation breakdown, and sample gender identity breakdown, as well as the community identification constructs and physical health constructs used in each study are provided in Table 3.

Across all studies in the final sample, 46.9% of articles contained indicators of health related to substance use, 25.0% contained indicators of health related to sexual behavior, 31.3% contained indicators of health related to health status, and 25.0% contained indicators of health related to utilization of health services. Many of the articles used contained multiple measures of physical health, which is why the total percentage of health indicators used exceeds 100 percent.

Four separate multilevel meta-analyses were conducted to examine the relationship between identification with the LGBTQ community and the four main indicators of physical health that emerged from the literature. Table 1 shows the overall effect sizes between identification with the LGBTQ community and substance use, sexual behavior, health status, and utilization of health services.

Effect of the relationship between community identification and substance use.

The meta-analysis exploring the relationship between LGBTQ community identification and substance use consisted of 47 effect sizes from 18 independent studies.

Overall effect size for substance use.

A weak, negative relationship between community identification and substance use was found, such that greater identification with the LGBTQ community was statistically significantly associated with more substance use ($r = -.058$, $p = .037$, $95\% CI = -.113, -.003$). The test of heterogeneity indicated that there was sufficient heterogeneity among the effect sizes to proceed with moderator analyses ($Q = 794.297$; $p < .001$). The forest plot in Figure 9 demonstrates the overall distribution of effect sizes for substance use. Moderator analyses were performed to examine potential variables that may be influencing the relationship between LGBTQ community connectedness and substance use.

Results of moderator analyses for substance use.

Type of LGBTQ community identification measure (Level 2).

I examined what type of connectedness to the LGBTQ community the community identification measures examined. Specifically, I was interested in whether the measure asked participants about feelings of connectedness to the LGBTQ community (such as believing that you are a part of the broader LGBTQ community), actions that expressed identification with the LGBTQ community (such as frequenting LGBTQ-specific bars or nightclubs), or both feelings and actions combined. Feeling was used as a reference category. Results indicated that type of community identification measure did not moderate the relationship between LGBTQ community identification and substance use, $F(2, 44) = 0.214, p = .808; b_0 = -.026; 95\% CI = -.169, .117; Action b = -.005; 95\% CI = -.158, .149; Both b = -.041; 95\% CI = -.211, .130.$

Publication year (Level 3).

The year each article was published was treated as a continuous variable at Level 3. Publication year did not prove to be a statistically significant moderator of the relationship between LGBTQ community identification and substance use, $F(1, 45) = 0.310, p = .580; b = -.004; 95\% CI = -.018, .010.$

Age (Level 3).

The mean age of each sample was treated as a continuous variable at Level 3. Age was not a statistically significant moderator of the relationship between LGBTQ community identification and substance use, $F(1, 45) = 2.179, p = .147; b = .006; 95\% CI = -.002, .015.$

Transgender identity (Level 3).

The percentage of the sample that identified as transgender was treated as a continuous variable. Transgender identity did not prove to be a statistically significant moderator of the

relationship between LGBTQ community identification and substance use, $F(1, 45) = .182, p = .672; b = -.003; 95\% CI = -.017, .011$.

Male identity (Level 3).

The percentage of the sample that identified as male or man was treated as a continuous variable. Male identity did not prove to be a statistically significant moderator of the relationship between LGBTQ community identification and substance use, $F(1, 45) = .815, p = .371; b = .001; 95\% CI = -.001, .002$. A figure depicting the effect sizes for all four health outcomes by percentage of each gender identity present in each sample can be found in Figure 4.

Sexual orientation (Level 3).

The sexual orientation categories that were examined in this study were gay/lesbian and bisexual/pansexual/queer. Identifying as gay or lesbian was a statistically significant moderator of the relationship between LGBTQ community connectedness and substance use, ($F(1, 45) = 5.177, p = .028; b = -.002; 95\% CI = -.003; -.000$). The average effect size at the mean percentage of the sample that identified as gay or lesbian was $-.020$. These findings indicate for each 10% increase above the mean in participants in the sample who identified as gay/lesbian, there was an expected $.02$ decrease in the magnitude of the relationship between LGBTQ community identification and healthier substance use behavior. In other words, the more participants there were in the sample who identified as gay/lesbian, the more LGBTQ community identification was associated with unhealthy substance use. Identifying as bisexual/pansexual/queer did not moderate the relationship between community identification and substance use $F(2, 44) = .265, p = .769; b = -.001; 95\% CI = -.005, .003$. A figure depicting the effect sizes for all four health outcomes by percentage of each sexual orientation present in each sample can be found in Figure 3.

Race (Level 3).

Within this dataset, the racial identity categories that contained enough information to be used as moderators were White/European Descent, Black/ African Descent, Latinx, Asian/ Asian Descent, and Other Race not Captured in the Previous Categories. Asian/ Asian Descent was a statistically significant moderator of the relationship between LGBTQ community connectedness and substance use, ($F(1, 45) = 7.004, p = .011; b = -.019; 95\% CI = -.034, -.005$). The average effect size at the mean percentage of the sample that identified as being of Asian descent was $-.026$. These findings indicate for each 10% increase above the mean in participants in the sample who identified as Asian or being of Asian descent, there was an expected $.19$ decrease in the magnitude of the relationship between LGBTQ community identification and healthier substance use behavior. In other words, the more participants there were in the sample who identified as Asian or being of Asian descent, the more LGBTQ community identification was associated with unhealthy substance use. Identifying as White/European Descent ($F(1, 45) = .005, p = .941; b = -.00; 95\% CI = -.002, .002$), Black/ African Descent ($F(1, 45) = .033, p = .857; b = -.00; 95\% CI = -.003, .002$), Latinx ($F(1, 45) = .111, p = .741; b = -.00; 95\% CI = -.003, .002$), or another Race not Captured in the Previous Categories ($F(1, 45) = .265, p = .610; b = .004; 95\% CI = -.011, .019$) were not significant moderators. A figure depicting the effect sizes for all four health outcomes by percentage of each race present in each sample can be found in Figure 2.

Effect size confidence (Level 2).

Results indicate that effect size confidence did not moderate the relationship between community identification and substance use, $F(1, 45) = .026, p = .872; b = .007; 95\% CI = -.075, .089$.

Community identification measure quality (Level 2).

Results indicate that quality of the community identification measure did not moderate the relationship between community identification and substance use, $F(1, 45) = .003, p = .958; b = -.001; 95\% CI = -.032, .030$.

Health measure quality (Level 2).

Quality of the health measure did not have enough variability in scores to be able to conduct moderator analyses. See Table 2 for information on viability of moderators for each health outcome. This table demonstrates that the health measure quality was coded as a 1 for every article that was included in the substance use meta-analysis.

LGBTQ identity measurement quality (Level 2).

Results indicate that quality of the LGBTQ identity measure did not moderate the relationship between community identification and substance use, $F(1, 45) = .509, p = .479; b = .036; 95\% CI = -.066, .139$.

Effect of the relationship between community identification and sexual behavior.

The meta-analysis exploring the relationship between LGBTQ community identification and sexual behavior consisted of 25 effect sizes from 8 independent studies.

Overall effect size for sexual behavior.

The overall relationship between community identification and sexual behavior was not statistically significant ($r = -.013, p = .863, 95\% CI = -.169, .143$). The test of heterogeneity indicated that there was sufficient heterogeneity among the effect sizes to proceed with moderator analyses ($Q = 250.810; p < .001$). Figure 10 demonstrates the overall distribution of effect sizes for sexual behavior. Moderator analyses were performed to examine potential

variables that may be influencing the relationship between LGBTQ community connectedness and sexual behavior.

Results of moderator analyses for sexual behavior.

Type of LGBTQ community identification measure (Level 2).

Results indicated that type of community identification measure did not moderate the relationship between LGBTQ community identification and sexual behavior, $F(2, 22) = .331, p = .722$; $b_0 = -.183$; $95\% CI = -.660, .294$; *Action* $b = .209$; $95\% CI = -.327, .745$; *Both* $b = .178$; $95\% CI = -.382, .739$.

Publication year (Level 3).

Publication year was a statistically significant moderator of the relationship between LGBTQ community identification and sexual behavior, $F(1, 23) = 12.745, p = .002$; $b = -.029$; $95\% CI = -.045, -.012$. Additionally, the average effect size at the mean publication year was $-.015$. These findings indicate for each one-year increase above the mean article publication year, there was an expected $.029$ decrease in the magnitude of the relationship between LGBTQ community identification and healthier sexual behavior. In other words, the more recently an article was published, the more LGBTQ community identification was associated with risky sexual behavior.

Age (Level 3).

Age did not prove to be a statistically significant moderator of the relationship between LGBTQ community identification and sexual behavior, $F(1, 23) = .635, p = .434$; $b = .013$; $95\% CI = -.021, .048$.

Transgender identity (Level 3).

One hundred percent of the participants in this subsample identified as cisgender, so transgender identity could not be used as a moderator.

Male identity (Level 3).

One hundred percent of the participants in this subsample identified as male or man, so male identity could not be used as a moderator.

Sexual Orientation (Level 3).

Results indicated that neither identifying as gay/lesbian ($F(1, 23) = .218, p = .645; b = -.001; 95\% CI = -.004, .003$) nor identifying as bisexual/pansexual/queer ($F(2, 22) = .086, p = .918; b = .001; 95\% CI = -.005, .006$) functioned as a moderator of the relationship between community identification and sexual behavior.

Race (Level 3).

Within this dataset, the racial identity categories that contained enough information to be used as moderators were White/European Descent, Black/ African Descent, Latinx, Asian/ Asian Descent, and Other Race not Captured in the Previous Categories. Asian/ Asian Descent was a statistically significant moderator of the relationship between LGBTQ community connectedness and sexual health behaviors, $F(1, 23) = 5.338, p = .030; b = .004; 95\% CI = .001, .008$.

Additionally, the average effect size at the mean percentage of the sample that identified as being of Asian descent was -.042. These findings indicate for each 10% increase above the mean in participants in the sample who identified as Asian or Asian descent, there was an expected .04 increase in the magnitude of the relationship between LGBTQ community identification and healthier sexual behavior. In other words, the more participants there were in the sample who identified as Asian or being of Asian descent, the more LGBTQ community identification was associated with safer sexual behavior. Identifying as White/European Descent ($F(1, 23) = .005, p$

= .945; $b = -.000$; 95% $CI = -.006, .006$), Black/ African Descent ($F(1, 23) = 1.576, p = .222$; $b = -.003$; 95% $CI = -.007, .002$), Latinx ($F(1, 23) = .811, p = .377$; $b = -.005$; 95% $CI = -.017, .007$) or another Race not Captured in the Previous Categories ($F(1, 23) = 2.130, p = .158$; $b = -.026$; 95% $CI = -.063, .011$) were not found to be statistically significant moderators.

Effect size confidence (Level 2).

Results indicate that effect size confidence did not moderate the relationship between community identification and sexual behavior, $F(1, 23) = .344, p = .563$; $b = .073$; 95% $CI = -.186, .333$.

Community identification measure quality (Level 2).

Results indicate quality if the community identification measure did not moderate the relationship between community identification and sexual behavior, $F(1, 23) = .023, p = .881$; $b = -.007$; 95% $CI = -.108, .093$.

Health measure quality (Level 2).

Quality of the health measure did not have enough variability in scores to be able to conduct moderator analyses.

LGBTQ identity measurement quality (Level 2).

Results indicate quality if the community identification measure did not moderate the relationship between community identification and sexual behavior, $F(1, 23) = .363, p = .553$; $b = -.062$; 95% $CI = -.273, .150$.

Effect of the relationship between community identification and health status.

The meta-analysis exploring the relationship between LGBTQ community identification and health status consisted of 18 effect sizes from 7 independent studies.

Overall effect size for health status.

The overall relationship between community identification and health status was not statistically significant ($r = -.009$, $p = .787$, $95\% CI = -.076, .058$). The test of heterogeneity indicated that there was sufficient heterogeneity among the effect sizes to proceed with moderator analyses ($Q = 288.444$; $p < .001$). Figure 11 demonstrates the overall distribution of effect sizes for health status. Moderator analyses were performed to examine potential variables that may be influencing the relationship between LGBTQ community connectedness and health status.

Results of moderator analyses for health status.

Type of LGBTQ community identification measure (Level 2).

Results indicated that type of community identification measure did not moderate the relationship between LGBTQ community identification and health status, $F(2, 15) = .254$, $p = .779$; $b_0 = .023$; $95\% CI = -.107, .152$; *Action* $b = -.039$; $95\% CI = -.198, .121$; *Both* $b = -.078$; $95\% CI = -.329, .173$.

Publication year (Level 3).

Publication year was a marginally statistically significant moderator of the relationship between LGBTQ community identification and health status, $F(1, 16) = 4.067$, $p = .051$; $b = -.021$; $95\% CI = -.001, .042$. Additionally, the average effect size at the mean publication year was $-.005$. These findings indicate for each one-year increase above the mean article publication year, there was an expected $.021$ decrease in the magnitude of the relationship between LGBTQ community identification and more positive health status. In other words, the more recently an article was published, the more LGBTQ community identification was associated with worse physical health.

Age (Level 3).

Age did not prove to be a statistically significant moderator of the relationship between LGBTQ community identification and health status, $F(1, 16) = 2.70, p = .120; b = .003; 95\% CI = -.001, .006$.

Transgender identity (Level 3).

Transgender identity was not a statistically significant moderator of the relationship between LGBTQ community identification and health status, $F(1, 16) = .425, p = .524; b = .001; 95\% CI = -.002, .004$.

Male identity (Level 3).

Male identity was not a statistically significant moderator of the relationship between LGBTQ community identification and health status, $F(1, 16) = .174, p = .682; b = -.000; 95\% CI = -.002, .002$.

Sexual Orientation (Level 3).

Results indicated that neither identifying as gay/lesbian ($F(1, 16) = 3.103, p = .097; b = .002; 95\% CI = -.000, .004$) nor identifying as bisexual/pansexual/queer ($F(2, 15) = 2.996, p = .103; b = -.002; 95\% CI = -.004, .000$) functioned as a moderator of the relationship between community identification and health status.

Race (Level 3).

Within this dataset, the racial identity categories that contained enough information to be used as moderators were White/European Descent, Black/ African Descent, Latinx, Asian/ Asian Descent, and Other Race not Captured in the Previous Categories. Results indicate that identifying as White/European Descent ($F(1, 16) = 1.315, p = .268; b = .002; 95\% CI = -.001, .004$), Black/ African Descent ($F(1, 16) = .504, p = .488; b = -.001; 95\% CI = -.004, .002$),

Latinx ($F(1, 16) = .433, p = .520; b = -.002; 95\% CI = -.008, .004$), Asian/ Asian Descent ($F(1, 16) = 1.474, p = .242; b = -.012; 95\% CI = -.032, .009$), or another Race not Captured in the Previous Categories ($F(1, 16) = .023, p = .882; b = .008; 95\% CI = -.009, .024$) were not found to be statistically significant moderators of the relationship between LGBTQ community identification and health status.

Effect size confidence (Level 2).

Results indicate that effect size confidence did not moderate the relationship between community identification and substance use, $F(1, 16) = .023, p = .882; b = .011; 95\% CI = -.145, .167$.

Community identification measure quality (Level 2).

Results indicate that quality of the community identification measure did not moderate the relationship between community identification and substance use, $F(1, 16) = .537, p = .474; b = .021; 95\% CI = -.039, .080$.

Health measure quality (Level 2).

Quality of the health measure did not have enough variability in scores to be able to conduct moderator analyses.

LGBTQ identity measurement quality (Level 2).

Results indicate that quality of the LGBTQ identity measure did not moderate the relationship between community identification and health status, $F(1, 16) = .006, p = .941; b = -.004; 95\% CI = -.120, .112$.

Effect of the relationship between community identification and utilization of health services.

The meta-analysis exploring the relationship between LGBTQ community identification and utilization of health services consisted of 9 effect sizes from 5 independent studies. Due to the very small sample size of this meta-analysis, these results should be interpreted with considerable caution.

Overall effect size for utilization of health services.

The overall relationship between community identification and utilization of health services was not statistically significant ($r = .0009$, $p = .828$, $95\% CI = -.087, .105$). The test of heterogeneity indicated that there was sufficient heterogeneity among the effect sizes to proceed with moderator analyses ($Q = 34.737$; $p < .001$). Figure 12 demonstrates the overall distribution of effect sizes for utilization of healthcare services. Moderator analyses were performed to examine potential variables that may be influencing the relationship between LGBTQ community connectedness and utilization of health services.

Results of moderator analyses for utilization of healthcare services.

Type of LGBTQ community identification measure (Level 2).

There were no studies included in this meta-analysis that were coded as measuring both feelings of community connectedness and actions related to community identification, so type of LGBTQ community identification measure was treated as a dichotomous variable. Results indicated that type of community identification measure did not moderate the relationship between LGBTQ community identification and utilization of health services, $F(1, 7) = .874$, $p = .381$; $b_0 = .065$; $95\% CI = -.118, .247$; $b_{Action} = -.087$; $95\% CI = -.309, .134$.

Publication year (Level 3).

Results indicate that publication year did not moderate the relationship between community identification and utilization of health services, $F(1, 7) = .015, p = .907; b = .001; 95\% CI = -.026, .028$.

Age (Level 3).

Age was found to be a statistically significant moderator, ($F(1, 7) = 7.339, p = .030; b = -.010; 95\% CI = -.018; -.001$). Additionally, the average effect size at the mean age of the sample was .018. These findings indicate for each 1-year increase above the mean in age of participants in the sample, there was an expected .010 decrease in the magnitude of the relationship between LGBTQ community identification and utilization of health services. In other words, the older participants in the sample were, the less LGBTQ community identification was associated with utilizing health services.

Transgender identity (Level 3).

There was not enough variability in the measure of transgender identity for it to be used as a moderator.

Male identity (Level 3).

Results indicate that percentage male identity did not moderate the relationship between community identification and utilization of health services, $F(1, 7) = .171, p = .692; b = -.000; 95\% CI = -.003, .022$.

Sexual Orientation (Level 3).

Results indicated that sexual orientation did not function as a moderator of the relationship between community identification and sexual behavior. Percent of the sample identifying as gay/lesbian did not moderate the relationship between community identification and utilization of health services, $F(1, 7) = .233, p = .644; b = .001; 95\% CI = -.002, .004$, and

neither did identifying as bisexual/pansexual/queer, $F(2, 6) = .122, p = .887; b = -.000; 95\% CI = -.010, .010$.

Race (Level 3).

Within this dataset, the racial identity categories that contained enough information to be used as moderators were White/European Descent, Black/ African Descent, Latinx, Asian/ Asian Descent, and Other Race not Captured in the Previous Categories. Identifying as a race other than White, Black, Latinx, or Asian was a marginally statistically significant moderator of the relationship between LGBTQ community connectedness and utilization of health services, $F(1, 7) = 5.536, p = .051; b = -.016; 95\% CI = -.033, .000$. Additionally, the average effect size at the mean percentage of the sample that identified as another race not previously specified was .023. These findings indicate for each 10% increase above the mean in participants in the sample who identified as a race other than White, Black, Latinx, or Asian, there was an expected .16 decrease in the magnitude of the relationship between LGBTQ community identification and utilization of health services. In other words, the more participants there were in the sample who identified as a race other than White, Black, Latinx, or Asian, the less LGBTQ community identification was associated with utilizing health services. Identifying as White/European Descent ($F(1, 7) = 2.515, p = .157; b = -.002; 95\% CI = -.005, .001$), Black/ African Descent ($F(1,7) = 3.832, p = .091; b = .002; 95\% CI = -.000, .004$), Latinx ($F(1, 7) = .446, p = .525; b = .003; 95\% CI = -.007, .013$) or Asian/ Asian Descent ($F(1,7) = .150, p = .710; b = .004; 95\% CI = -.022, -.031$) were not statistically significant moderators of the relationship between community identification and utilization of health services.

Effect size confidence (Level 2).

Results indicate that confidence in the estimate of the effect size did not moderate the relationship between community identification and utilization of health services, $F(1, 7) = .092$, $p = .771$; $b = .029$; 95% CI = -.200, .258.

Community identification measure quality (Level 2).

Results indicate that quality of the community identification measure did not moderate the relationship between community identification and utilization of health services, $F(1, 7) = .014$, $p = .909$; $b = .008$; 95% CI = -.152, .168.

Health measure quality (Level 2).

There was not enough variability in the quality of the health measure for it to be used as a moderator.

LGBTQ identity measurement quality (Level 2).

Results indicate that quality of the LGBTQ identity measure did not moderate the relationship between community identification and utilization of health services, $F(1, 7) = 1.880$, $p = .213$; $b = .087$; 95% CI = -.063, .237.

Discussion

This study used multilevel meta-analytic techniques to examine the relationship between identification with the LGBTQ community and health across a wide range of LGBTQ populations, locations, and indicators of physical health. This study focused on four distinct categories of physical health indicators that emerged from the literature: substance use, sexual behaviors, health status, and utilization of health services. Additionally, this study aimed to explore potential moderators of the relationships between identification with the LGBTQ community and each of the four indicators of physical health. Theoretically important

moderators included type of LGBTQ community identification, publication year, mean age of the sample, gender identity, transgender identity, sexual orientation, and race.

Substance Use.

Overall, substance use was the only indicator of physical health that exhibited a statistically significant relationship with LGBTQ community identification before moderators were considered. This finding demonstrated that stronger identification with the LGBTQ community was weakly associated with more substance use. One reason why this may be the case is historically, some of the only LGBTQ-friendly spaces for LGBTQ people to interact with one another have been bars and nightclubs (LeBeau & Jellison, 2009; Parks & Hughes, 2007), and alcohol consumption and recreational drug use are common occurrences at these types of venues. Because these are commonly the types of spaces where LGBTQ individuals can go to meet other LGBTQ people, if someone wanted to get involved in the LGBTQ community and meet others, it could be difficult to participate in these spaces without using substances.

Identifying as Asian or of Asian descent was a statistically significant moderator of the relationship between identification with the LGBTQ community and substance use such that the more participants there were who identified as Asian or of Asian descent, the more LGBTQ community identification was predicted to be associated with unhealthy substance use. Much like experiences of racism and microaggressions in the broader community, there is evidence to suggest that Asian and Asian American LGBTQ individuals face racism and discrimination within the LGBTQ community (Newman & Muzzonigro, 1993). Especially within the United States, there are stereotypes about Asian and Asian American individuals, particularly men, being naturally feminine and non-sexual (Chung & Singh, 2009). These traits are often viewed as unattractive and undesirable within the gay community, making LGBTQ men of Asian descent

further marginalized within the LGBTQ community. Additionally, LGBTQ identities are often viewed as deviant and morally corrupt from many Asian cultural perspectives (Chung & Singh). Experiencing LGBTQ-based discrimination from within one's racial community and racism from the LGBTQ community, in addition to discrimination experiences from mainstream White, heteronormative culture, can result in large amounts of minority stress for Asian and Asian American individuals. Because minority stress is associated with increased substance use (Meyer, 2003) and individuals of Asian descent may experience discrimination from within the LGBTQ community, it is possible that more involvement with the LGBTQ community may be associated with increased experiences of discrimination, resulting in more substance use.

Additionally, identifying as gay/lesbian was a statistically significant moderator of the relationship between identification with the LGBTQ community and substance use. The more participants in the sample who identified as gay or lesbian, the more LGBTQ community identification was associated with unhealthy substance use. It is unclear why the results emerged for the percentage of gay and lesbian participants but not for percentage of bisexual, pansexual, and queer participants because there is vast evidence to suggest individuals who engage in sexual and romantic relationships with people of more than one gender experience discrimination within the LGBTQ community (Burke & LaFrance, 2016; Feinstein, Dyar, Bhatia, Latack, & Davila, 2014), which would likely result in greater substance use. One possible explanation for this relationship could be that venues traditionally associated with substance use, such as bars and clubs, are more welcoming to gay and lesbian individuals than individuals who do not have a monosexual sexual identity (i.e. bisexual, pansexual, and queer individuals). Perhaps gay and lesbian individuals visit LGBTQ-specific bars and clubs more frequently than bisexual,

pansexual, and queer individuals, resulting in stronger associations with the LGBTQ community and higher rates of substance use for gay and lesbian people.

Sexual Behavior.

Sexual behavior was not found to have a statistically significant relationship with identification with the LGBTQ community, but two different variables emerged as statistically significant moderators of this relationship. Article publication year was a statistically significant moderator of the relationship between identification with the LGBTQ community and sexual behavior such that the more recently an article was published, the more LGBTQ community identification was predicted to be associated with risky sexual behavior. One possible explanation for this pattern could be that more recent advances that have been made to prevent the transmission of HIV have contributed to riskier overall sexual behaviors. For example, the creation of pre-exposure prophylaxis (PrEP) medications has made promising advances toward prevention of HIV contraction for HIV-negative individuals who are at a high risk of contracting the virus. Though this is by and large a positive advancement, it is possible that using these medications may be associated with more risky sexual behavior because contracting HIV is less of a concern. A longitudinal study by Chen, Snowden, McFarland, and Raymond (2016) found that the advent and distribution of PrEP coincided with a drastic decrease in condom use and an increase in condomless anal sex with multiple partners among communities of men who have sex with men in San Francisco. Additionally, in a study of the efficacy of a brief sexual risk behavior intervention, Golub, Kowalczyk, Weinberger, and Parsons (2010) found that over 35% of men who have sex with men who were at high risk for contracting HIV reported that they would likely decrease condom use if they began using PrEP. Though medications designed to prevent the spread of HIV can largely improve health within the LGBTQ community, there may also be

a need for improved prevention programs that foster safe sexual practices in the LGBTQ community in the era of PrEP.

Another explanation for this relationship could be sexual behavior in general is becoming less stigmatized and as a result, people feel more comfortable giving honest reports of sexual encounters. It is possible that there is little to no change in actual behaviors, but the relationship between LGBTQ community identification and risky sexual behavior appears to be stronger in more recently published articles because people are being more open when talking about sex.

Identifying as Asian or of Asian descent was also a statistically significant moderator of the relationship between identification with the LGBTQ community and sexual behavior such that the more participants there were in the sample who identified as Asian or of Asian descent, the more LGBTQ community identification was associated with *safer* sexual behavior. Similar results have been found in previous literature. Chae and Yoshikawa (2008) found that Asian gay men who have a positive view of the Asian gay community engage in less unprotected anal intercourse than Asian gay men with a negative view of the Asian gay community. Research on other populations has found that a stronger sense of belonging is associated with more safe sexual practices like condom use (Nelson et al., 2015). Because it is common for Asian and Asian American individuals to experience discrimination from within the LGBTQ community (Chung & Singh, 2009), Asian LGBTQ individuals likely need to work especially hard to get connected with a supportive and affirming community of LGBTQ individuals. If this is achieved, connection to the LGBTQ community is likely associated with a stronger sense of belonging, and in turn, more sexual health promoting behaviors. Interestingly, this relationship is in the opposite direction of the relationship between community identification and substance use with Asian descent as a moderator. See figure 2 for a breakdown of effect sizes for each health

outcome by race. The figure demonstrated that though few studies consisted of samples where at least 20% of the sample identified as being of Asian descent, the studies that did demonstrated consistently positive effect sizes. More research is needed to explore why community identification may be differentially associated with different health outcomes for individuals of Asian descent.

Health Status.

Health status was not found to have a statistically significant relationship with identification with the LGBTQ community. However, article publication year was a moderator of this relationship. The more recently an article was published, the more LGBTQ community identification was associated with worse physical health. While it is possible that LGBTQ health may actually be getting worse over time, a more plausible explanation is that more contemporary research is beginning to explore a wider range of health issues, as well as more populations with diverse LGBTQ identities. Historically, most of the LGBTQ health research has focused on HIV/AIDS prevalence among gay men (Snyder, 2011), and while this is still true, there is more variety in the research being published today. Rather than the role of community identification in LGBTQ health decreasing over time, it is possible that researchers are now exploring different indicators of physical health, increasing the number of health disparities in the LGBTQ community that we are aware of. Similarly, more research on transgender individuals, sexual minority women, and LGBTQ people of color exists, meaning we are examining more health disparities that are affected by multiple marginalized identities. It is possible that the relationship between LGBTQ community identification and indicators of physical health in recent years reflects the ways having multiple stigmatized identities influences overall health.

Utilization of Health Services.

Utilization of health services was not found to have a statistically significant relationship with identification with the LGBTQ community. However, participant age was a moderator of the relationship such that the older participants in the sample were, the less LGBTQ community identification was associated with utilizing health services. LGBTQ older adults report more chronic health conditions than non-LGBTQ older adults (Fredriksen-Goldsen et al., 2017). However, many older LGBTQ adults face discrimination or social invisibility because healthcare professionals and other service providers do not often think of older patients or clients as being members of the LGBTQ community (Gendron et al., 2013). This could potentially result in LGBTQ older adults distancing themselves from the LGBTQ community if they require frequent medical services, as an attempt to avoid experiencing discrimination from the healthcare system. Additionally, LGBTQ older adults were alive when the societally accepted understanding was that an LGBTQ identity was a harmful disease, a moral deviance, or a crime. Similarly, much of the historical trauma that LGBTQ older adults have endured has been associated with medical establishments and health care systems (Butler, 2004). Because of this, LGBTQ older adults may be more apprehensive about utilizing health care services, especially if the LGBTQ community is an important part of their identity or a large portion of their life. LGBTQ older adults may have health care needs that are different from those of non-LGBTQ older adults and access to LGBTQ-specific health care services may be especially important for aging transgender individuals. Health care professionals should receive competency training for interacting with LGBTQ older adult patients, and compassionate, trauma-informed health interventions tailored to LGBTQ older adults should be created so aging LGBTQ populations can access safe and affirming health care without fear of discrimination or harm at the hands of health care providers.

Identifying as a race other than the categories provided was also a statistically significant moderator of the relationship between LGBTQ community identification and utilization of health services such that the more participants there were in the sample who identified as a race other than White, Black, Latinx, or Asian, the less LGBTQ community identification was associated with utilizing health services. One possible explanation for this relationship could be that individuals who identify as a race other than White, Black, Latinx, or Asian experience less identification with the LGBTQ community because they may not fit in to particular race-based subcultures within the LGBTQ community. For example, it is not uncommon for Black, Latinx, and Asian LGBTQ individuals to create social communities of LGBTQ friends of the same race. If someone is a race other than one of the four races that were consistently represented in the literature, a sense of identification with the LGBTQ community may not be as strong due to lack of representation of one's race or lack of exposure to racially similar others, and as a result, may not be as strongly associated with utilizing health services.

Summary of the current study.

All but one statistically significant finding from this study indicated a negative relationship between LGBTQ community identification and indicators of physical health. More research is needed to investigate the ways LGBTQ community involvement may be associated with negative indicators of physical health, particularly for members of the LGBTQ community who experience marginalization in other domains as well.

Additionally, there were a few variables that were used as potential moderators that did not have enough variability to be tested in some of the meta-analytic models. Specifically, this meta-analysis failed to capture enough variability in percent of samples with varied gender identity or transgender identity. Likewise, it was not possible to test quality of the assessment of

physical health measures as a moderator. The lack of variability in these variables point to current trends in the LGBTQ health literature that have room for improvement. These trends, as well as other areas of improvement will be addressed in the recommendations section.

Recommendations.

The findings from this study indicate a variety of inconsistencies in the field of LGBTQ health that make it challenging to interpret and generalize this particular type of research. The difficulties that arose from this meta-analytic process have informed multiple recommendations for strengthening future studies in the LGBTQ health field.

Specificity in measuring LGBTQ identity.

The review of the existing literature demonstrated that there are numerous labels used to indicate that participants are members of the LGBTQ community. While it is important to recognize that human experience, and by extension, human sexuality and gender identity, does not always fit neatly into categories, the lack of consistency in the way LGBTQ identity is measured makes it difficult to extrapolate findings that can inform targeted health programs and policies for LGBTQ identifying individuals. For example, many of the articles included in this project identified their sample as consisting of men who have sex with men (MSM). The label of MSM was most often utilized in articles related to sexual risk taking and HIV prevention, most likely to indicate the behavior of having sex with men is seemingly more meaningful in that context than a particular sexual orientation label. However, the experiences of a gay man, a bisexual man, and a man who has sexual encounters with men but chooses to identify as heterosexual are likely vastly different from one another and this may differentially influence particular health behaviors. These differences are not considered when all of these men are put in the same sexual orientation category, even though they may all be men who have sex with men.

Additionally, it is challenging to aggregate or compare findings from studies when some studies give participants the option to specify particular sexual orientation labels (e.g. gay vs bisexual vs heterosexual) and other studies do not provide this information. Future research should provide more specificity when reporting participant sexual orientation and gender identity.

More racially diverse samples.

The majority of articles identified for this study consisted of samples that were predominantly White. Figure 2 shows that the majority of the effect sizes calculated for this study were derived from predominantly White samples. A lack of racial diversity in the literature creates opportunities to miss potentially important racial differences in health outcomes. In the current study, Asian identity emerged as a moderator of the relationship between LGBTQ community identification and two separate indicators of physical health. Asian and Asian American individuals are a largely understudied population within the LGBTQ community, but the findings from the current study suggest that this particular population should be examined further. More racial diversity in LGBTQ studies can help researchers develop a more accurate understanding of the LGBTQ community as a whole.

More than just gay men.

The majority of the research conducted on LGBTQ health focuses on the experiences of cisgender gay men, but this is not an accurate portrayal of the LGBTQ experience. Figure 3 shows that most of the effect sizes calculated for this study were derived from samples that consisted predominantly, or exclusively, of gay men or men who have sex with men. It is important to explore gender- and sex-based differences in health research of any kind, but it is especially important to explore when the health outcomes of a particular population, like the LGBTQ community, appear to be mostly negative. Because cisgender gay men are arguably the

most privileged members of the LGBTQ community due to the preferential social status afforded to men and to cisgender individuals, it is not appropriate to use them as the reference point for social determinants of health, because individuals with more marginalized identities will have different social experiences. More research in the LGBTQ health field should be conducted with women as well as transgender and non-binary individuals to understand the differing health outcomes of these populations.

Research with transgender populations.

It is important to recognize that transgender individuals are vastly underrepresented in all areas of research, including LGBTQ-specific research. Figure 4 shows that every sample used in this study but one consisted of predominantly cisgender participants or participants who were not specifically identified as being either cisgender or transgender. Because transgender participants are often difficult to recruit, gender minority individuals are often grouped in with sexual minority individuals in research. This may be an enticing option to help researchers obtain a larger sample size or to make an effort to include transgender participants in research, but this method of putting sexual and gender minority participants together does a disservice to transgender participants and is not the most methodologically appropriate option. Even though sexual and gender minority individuals all fall under the LGBTQ umbrella, sexual identity and gender identity are not the same construct, so it does not make sense to analyze them together. Additionally, health care needs of transgender and cisgender individuals are often different, so analyzing sexual and gender minority individuals together as one group, especially in health research, can overlook important health differences and disparities that may exist.

Not only should the practice of creating one LGBTQ group for research purposes be adjusted, but there is a need for more research that is specific to the health and experiences of

transgender individuals. Research on transgender health is a small, and relatively new field of study. The Centers for Disease Control and Prevention included an optional module to assess gender identity in the Behavioral Risk Factor Surveillance System in 2014, making it the first nationally representative health survey to attempt to record gender identity data (Henderson, Blosnich, Herman, & Meyer, 2019). It is imperative that more high-quality research on transgender health gets published in order to better understand the specific needs of this population. Lack of visibility of a particular population can lead to further perpetuation of harmful stereotypes. If research on transgender health needs does not exist, effective policies and interventions designed to address health disparities cannot be created. This pattern can leave an already marginalized group of people without comprehensive and appropriate health services.

Higher quality health measures.

The vast majority of the research included in this meta-analytic review used self-report measures to address indicators of physical health. Though self-report is an acceptable way to address health, it is important to incorporate more sophisticated physiological measures in this area of research. In the preliminary literature review for this study, as well as the articles identified for analysis, the majority of the research that was found focused on examining substance use and sexual behavior among LGBTQ individuals. Substance use and sexual health are both important health outcomes to explore within the LGBTQ community, but there are numerous other indicators of physical health that may differentially affect LGBTQ people that are not being explored. Increasing the use of physiological measures in LGBTQ health research could lead to more variety in the indicators of physical health that could be studied. For example, studies that utilize measures of physiological stress, such as heartrate variability and cortisol

reactivity measures, could provide more nuance to research on health outcomes associated with experiences of minority stress for LGBTQ individuals.

Conclusions

The current study utilized multilevel meta-analytic techniques to examine the association between identification with the LGBTQ community and indicators of physical health in the existing literature. Findings from this study demonstrate that the association between identification with the LGBTQ community and indicators of physical health has mostly negative, or currently inconclusive outcomes. Additionally, a number of areas of the LGBTQ health field were examined and suggestions were made for improvement in future research on this topic.

The inconsistencies highlighted in this meta-analytic review have important implications for research on the health and well-being of LGBTQ individuals. Moving forward, it is important to recognize which individuals are consistently under-represented in LGBTQ samples. Specifically, participants of color, transgender participants, and participants who are women are not sufficiently recruited, or represented, in research examining health within the LGBTQ community. Researchers should take care to sample from these particular populations to better understand the health of individuals who may be marginalized within the LGBTQ community.

Additionally, there is a need for greater consistency in language used within the LGBTQ health field. It may be helpful for future research to have more uniform measures of sexual orientation and gender identity. This consistency could allow researchers to better understand the health needs of particular groups of sexual and gender minority individuals, rather than operating as if all LGBTQ individuals have similar health needs. By being more consistent and precise in the language used to describe LGBTQ samples, we can have a better understanding of the differential health outcomes of each LGBTQ subgroup. Finally, the field of LGBTQ health

research should broaden the scope of health outcomes and health behaviors that are explored. It is important to understand the ways in which being a member of the LGBTQ community could interact with various predictors of health outcomes such as cardiovascular disease and cancer. Similarly, large-scale health organizations should expand funding for research on LGBTQ health that is not specific to substance use or HIV/AIDS. It is important to continue funding for HIV/AIDS research, but health organizations such as The American Heart Association and the National Foundation for Cancer Research should provide additional funding to examine how these diseases affect LGBTQ individuals as well. The more these issues are funded, the more research we can conduct to understand the topic of disparities in the health outcomes of LGBTQ communities and work to address those disparities.

This study demonstrates that the relationship between LGBTQ community identification and indicators of physical health is complicated and requires further exploration. Overall, these findings seem to suggest that stronger identification with the LGBTQ community may not be fostering community resilience, but rather, may be creating more opportunities to experience minority stress for some LGBTQ individuals. Individuals with multiple marginalized identities may be experiencing stigma and discrimination within the LGBTQ community, as well as in the broader society. It may therefore be important to examine the ways in which the LGBTQ community could be more inclusive for individuals who experience marginalization for multiple identities. It is important to explore how the culture of the LGBTQ community could be improved in such a way that stronger identification with the LGBTQ community could function as a protective factor against minority stress, rather than having no effect or harmful effects for some health outcomes and health behaviors.

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Table 1

Overall Heterogeneity among Each of the Four Health Outcomes

Outcome	s	k	Mean r	95% CI	p	σ^2 level2	σ^2 level3	% Var. level 1	% Var. level 2	% Var. level 3
Substance Use	18	47	-.058	-.113; -.003	.037*	.006*	.013***	6.30	29.44	64.26
Sexual Behavior	8	25	-.013	-.169; .143	.863	.009***	.039***	4.77	18.73	76.51
Health Status	11	18	-.009	-.076; .058	.787	.000	.015***	4.36	1.70	93.94
Health Care Utilization	7	9	.009	-.087; .105	.828	.010	.000***	6.06	0.01	93.93

Note. s = number of studies; k = number of effect sizes; Mean r = mean effect size (r); CI = confidence interval; σ^2 level2 = estimated value for the variance between effect sizes within the same study; σ^2 level3 = estimated value for the variance between studies; % Var. level 1 = sampling error; % Var. level 2 = variance among effect sizes within a study; % Var. level 3 = variance between studies; * = significant heterogeneity at the .05 level; ** = significant heterogeneity at the .01 level; *** = significant heterogeneity at the .001 level.

Table 2

Characteristics and Outcomes of the Moderators Used among Each of the Four Health Outcomes

Characteristics of Moderators				Outcomes and Moderators							
Moderators	Level	Type of Variable	Overall Mean (SD) Range:	Substance Use		Sexual Behavior		Health Status		Health Care Utilization	
				Mean or % (SD)	95% CI for Test of Moderation	Mean or % (SD)	95% CI for Test of Moderation	Mean of % (SD)	95% CI for Test of Moderation	Mean or % (SD)	95% CI for Test of Moderation
Community ID Type	2	Categorical	2.03 (.61) Range: 1-3	20.9% Feeling, 76.7% Action, 11.6% Both	CI = -.169, .117; <i>p</i> = .808	16.0% Feeling, 60.0% Action, 24% Both	CI = -.660, .294; <i>p</i> = .722	33.3% Feeling, 55.5% Action, 11.1% Both	CI = -.107, .152; <i>p</i> = .779	33.3% Feeling, 55.5% Action, 11.1% Both	CI = -.118, .247; <i>p</i> = .381
Effect Size Confidence	2	Continuous	2.19 (.74) Range: 1-3	1.89 (.81)	CI = -.075, .089; <i>p</i> = .872	2.24 (.523)	CI = -.186, .333; <i>p</i> = .563	2.72 (.461)	CI = -.145, .167; <i>p</i> = .474	2.56 (.53)	CI = -.200, .258; <i>p</i> = .909
Community ID Measure Quality	2	Continuous	3.03 (1.43) Range: 1-5	2.89 (1.36)	CI = -.032, .030; <i>p</i> = .872	2.64 (1.73)	CI = -.108, .093; <i>p</i> = .881	3.78 (1.22)	CI = -.039, .080; <i>p</i> = .474	3.33 (.71)	CI = -.152, .168; <i>p</i> = .909
Health Measure Quality	2	Continuous	1.07 (.435) Range: 1-5	1.00 (0.00)	---	1.00 (0.00)	---	1.38 (.09)	---	1.00 (0.00)	---

Sample Measure Quality	2	Continuous	2.26 (.60) Range: 1-5	2.26 (.49)	CI = -.066, .139; <i>p</i> = .479	2.24 (.723)	CI = -.273, .150; <i>p</i> = .553	2.17 (.618)	CI = -.120, .112; <i>p</i> = .941	2.56 (.73)	CI = -.063, .237; <i>p</i> = .213
Publication Year	3	Continuous	2013.36 (4.70)	2013.70 (4.38)	CI = -.018, .010; <i>p</i> =.580	2010.72 (5.49)	CI = -.045, - .012; <i>p</i> = .002**	2014.83 (2.94)	CI = -.001, .042; <i>p</i> = .051*	2016 (4.0)	CI = -.026, .028; <i>p</i> = .907
Mean Age	3	Continuous	28.85 (11.05)	23.52 (5.49)	CI = -.002, .015; <i>p</i> = .147	30.18 (4.60)	CI = -.021, .048; <i>p</i> = .434	40.90 (17.80)	CI = -.001, .006; <i>p</i> = .120	28.93 (9.31)	CI = -.018, - .001; <i>p</i> = .030*
% Cisgender	3	Continuous	97.47 (10.75)	98.59 (3.74)	CI = -.017, .011; <i>p</i> = .672	---	---	90.23 (23.57)	CI = -.002, .004; <i>p</i> = .524	---	---
% Man	3	Continuous	69.20 (36.46)	53.77 (35.19)	CI = -.001, .002; <i>p</i> = .371	---	---	62.38 (35.44)	CI = -.002, .002; <i>p</i> = .682	77.80 (44.05)	CI = -.003, .022; <i>p</i> = .692
% Gay/Lesbian	3	Continuous	51.41 (34.32)	51.91 (26.92)	CI = -.003, - .000; <i>p</i> = .028*	42.72 (42.78)	CI = -.004, .003; <i>p</i> = .645	72.27 (28.45)	CI = -.000, .004; <i>p</i> = .097	53.44 (41.88)	CI = -.002, .004; <i>p</i> = .644
% Bisexual/Pansexual/Queer	3	Continuous	21.07 (19.25)	47.99 (27.53)	CI = -.005, .003; <i>p</i> = .769	57.04 (42.93)	CI = -.005, .006; <i>p</i> = .918	26.10 (28.18)	CI = -.004, .000; <i>p</i> = .103	46.54 (41.90)	CI = -.010, .010; <i>p</i> = .887
% Asian	3	Continuous	14.04 (12.82)	11.12 (2.50)	CI = -.034, - .005; <i>p</i> = .011*	10.46 (24.20)	CI = .001, .008; <i>p</i> = .030*	3.25 (3.70)	CI = -.032, .009; <i>p</i> = .242	4.48 (4.32)	CI = -.022, - .031; <i>p</i> = .710
% Black	3	Continuous	23.41 (26.70)	19.51 (20.17)	CI = -.003, .002; <i>p</i> =.857	31.38 (33.01)	CI = -.007, .002; <i>p</i> = .222	18.20 (22.52)	CI = -.004, .002; <i>p</i> = .488	32.04 (40.20)	CI = -.000, .004; <i>p</i> = .091

% Latinx	3	Continuous	15.89 (16.39)	16.45 (18.82)	CI = -.003, .002; <i>p</i> = .741	18.29 (15.21)	CI = -.017, .007; <i>p</i> = .377	11.78 (12.28)	CI = -.008, .004; <i>p</i> = .520	14.54 (13.34)	CI = -.007, .013; <i>p</i> = .710
% White	3	Continuous	54.03 (29.59)	58.33 (29.92)	CI = -.002, - .002; <i>p</i> = .941	37.64 (23.96)	CI = -.006, .006; <i>p</i> = .945	68.45 (23.58)	CI = -.001, .004; <i>p</i> = .268	48.24 (34.94)	CI = -.005, .001; <i>p</i> = .157
% Other Race	3	Continuous	5.62 (4.43)	6.96 (3.10)	CI = -.011, .019; <i>p</i> = .610	2.24 (2.30)	CI = -.063, .011; <i>p</i> = .158	5.69 (4.00)	CI = -.145, .167; <i>p</i> = .882	5.70 (4.80)	CI = -.033, .000; <i>p</i> = .051

Table 3

Descriptive Statistics of Articles Used in the Entire Sample Organized by Health Outcome

Authors	Year	Sample Size	Sample Sexual Orientation	Sample Gender ID	Community ID Construct	Health Construct	Effect Size
Substance Use							
1. Buttram et al.	2012	482	100% MSM	100% Unspecified Man	Gay Neighborhood Residence	Methamphetamine Use	-0.11
						Cocaine Use	0.27
						Crack Cocaine Use	0.13
						Amyl Nitrate Use	-0.13
						RX Opioid Use	0.12
						DSM Substance Dependence	0.20
2. Demant et al.	2018	1266	44.07% Gay, 12.40% Lesbian, 32.15% Bisexual/Pansexual, 5.37% Queer, 18.41% Other	40.5% Cisgender Woman, 53.95% CM, 6% Transgender	Connectedness to the LGBT Community	Substance Use	-0.03
							Participation in the LGBT Community

3. Cramer et al.	2018	475	21.1% Gay, 4.4% Lesbian, 46.5% Bisexual/Pansexual, 5.9% Other, 17.3% Unknown, 4.8% Queer	49.9% Cisgender Woman, 3.4% Transgender Woman, 37.5% Cisgender Man, 2.9% Transgender Man, 6.3% Gender Non- Conforming	LGB Community Involvement	Alcohol Use	-0.09
						Drug Use	0.09
4. Feinstein et al.	2017	288	39.24% Lesbian, 36.80% Bisexual/Pansexual, 23.96% Queer	100% Unspecified Woman	LGBT Community Involvement	Alcohol Abuse	-0.22
						Drug Abuse	-0.08
5. Feinstein et al.	2019	169	35.5% Gay, 37.9% Lesbian, 20.12% Bisexual	55.6% Cisgender Woman, 2.4% Transgender Woman, 41.4% Cisgender Man, .5% Transgender Man	Outness	Illicit Drug Use	-0.14
6. Fernandez et al.	2007	566	100% MSM	100% Unspecified Man	Gay Community Attachment	Chrystal Meth Use	-0.15

7. Goldbach et al.	2015	1911	55% Gay, 11% Lesbian, 35% Bisexual/Pansexual	63.82% Cisgender Man, 36.18% Cisgender Woman	Community Connectedness	Marijuana Use (Last 30 Days)	-0.35
8. Holloway et al.	2012	526	71% Gay, 17% Bisexual	100% Unspecified Man	Community Identification	Health Values	0.02
						Smoking	-0.01
					Gay Bar Attendance	Health Values	0
						Smoking	-0.01
9. Hotton et al.	2018	628	100% MSM	100% Cisgender Man	Gay Community Closeness	Marijuana Use	-0.01
10. Johns et al.	2013	471	54.78% Lesbian, 32.7% Bisexual, 12.53% Other	100% Unspecified Woman	LGBT Community Connectedness	Smoking	0.11
					LGBT Organizational Membership		-0.14
					LGBT Social Participation		-0.02
					Friends of Same Identity		-0.08
					Time Spent with Same		0.04

					Sex Attracted Women		
11. Kuper & Bos	2016	580	26.38% Gay/Lesbian, 73.62% Mostly Heterosexual	32.1% Unspecified Man, 67.9% Unspecified Woman	Openness to Family	Binge Drinking	-0.03
						Smoking	0.02
						Drug Use	-0.02
					Openness to Others	Binge Drinking	-0.01
						Smoking	-0.05
						Drug Use	-0.06
					LGB Community Involvement	Binge Drinking	-0.05
						Smoking	-0.08
						Drug Use	-0.04
					Number of LGB Friends	Binge Drinking	0.07
						Smoking	-0.09
						Drug Use	-0.01

12. Lelutiu-Weinberger et al.	2013	302	91% Gay, 9% Bisexual	100% Unspecified Man	Involvement with the Gay Community	Drug Use	0.20	
13. Puckett et al.	2017	450	50.2% Gay, 21.3% Bisexual, .7% Heterosexual, 22.9% Mostly Gay, 2.4% Mostly Heterosexual, 2.4% Other	100% Cisgender Man	Gay Community Connection	Alcohol Use	-0.07	
						Marijuana Use	-0.05	
						Hard Drug Use	-0.03	
14. Rosario et al.	2004	156	66% Gay/Lesbian, 31% Bisexual, 3% Other	51.28% Unspecified Man, 48.1% Unspecified Woman	Number of Gay-Related Activities	Smoking	-0.01	
						Alcohol Use	-0.02	
						Substance Use	0.01	
						Number of People Disclosed to	Smoking	-0.11
						Alcohol Use	-0.18	
Substance Use	-0.01							

15. Ruben et al.	2016	47	60% Gay/Lesbian, 21% Bisexual, 19% Other	19% Cisgender Woman, 11% Transgender Woman, 68% Cisgender Man, 2% Transgender Man	LGBT Community Connectedness	Tobacco Use	0.03
						Alcohol Use	-0.02
Sexual Behavior							
16. Aycock	2012	96	100% MSM	100% Unspecified Man	Connectedness to GLB Community	Protective Sexual Behavior	-0.17
1. Buttram et al.					Gay Neighborhood Residence	Receptive Unprotected Anal Intercourse	-0.113
						Insertive Unprotected Anal Intercourse	-0.08
						Buying Sex	0.21
						Trading Sex	0.21
17. Chan et al.	2017	541	100% MSM	100% Unspecified Man	Outness to Family	Casual Sex Seeking	-0.04
					Outness to World		-0.07
18. Flores et al.	2009	483	73% Gay, 18% Bisexual/Pansexual, 2% Heterosexual,	100% Unspecified Man	Gay Community Involvement	Unprotected Insertive Anal Sex	-0.02

	3% Other, 5% Queer	Unprotected Receptive Anal Sex	-0.08
		Discordant Unprotected Insertive Anal Sex	-0.01
		Discordant Unprotected Receptive Anal Sex	-0.06
	Gay Bar/Club Attendance	Unprotected Receptive Anal Sex	-0.05
		Discordant Unprotected Insertive Anal Sex	-0.03
		Discordant Unprotected Insertive Anal Sex	-0.08
		Discordant Unprotected Receptive Anal Sex	-0.06
9. Hotton et al.		Condomless Anal Sex	-0.02
		Transactional Sex	-0.33
		Any HIV Unknown Status Partner	-0.11

						Sex with Drug Use	-0.25
12. Lelutiu-Weinberger et al.					Involvement with the Gay Community	High-Risk Sexual Behavior	-0.26
						High-Risk Sex Under the Influence	-0.26
19. Ratti et al.	2000	98	100% Gay/Bisexual	100% Unspecified Man	Acculturation to the Gay Community	High Risk Anal Sex	0.49
						High Risk Oral Sex	0.37
						Sexual Communication	0.25
20. Wong & Tang	2004	187	100% Gay	100% Unspecified Man	Involvement in the Gay Community	Condom Use (Last 6 Months)	0.18
Health Status							
21. Davids & Green	2011	439	21.1% Gay, 11.23% Lesbian, 38.77% Bisexual, 25.55% Heterosexual	36.78% Unspecified Man, 59.91% Unspecified Woman	Gay Community Involvement	Disordered Eating Behavior	-0.27
22. Fredriksen-Goldsen et al.	2017	2450	72.9% Gay/Lesbian, 17.19% Bisexual/Pansexual, 10.32% Other	43.17% Cisgender Woman, 50.76% Cisgender Man, 6.07%	LGBT Identity Affirmation	Health Promoting Behavior	0.07

			Sexual Orientation	Unspecified Transgender		Health Risk Behavior Physical Health	0.21 -0.17
23. Hoy-Ellis et al.	2016	2349	94.6% Gay, 5.4% Bisexual	35.4% Cisgender Woman, 64.6% Cisgender Man	Disclosure to Family	Chronic Health Conditions	0.08
					Disclosure to Friends		0.04
					Disclosure to Community		0.05
9. Hotton et al.					Gay Community Closeness	HIV+ Status	-0.01
24. McGarrity et al.	2014	564	90% Gay, 10% Bisexual	100% Unspecified Man	Outness	Sick Days	-0.03
						Medication Use	-0.13
25. Nuttbrock et al.	2013	230	25.40% Lesbian, 13.8% Bisexual, 58.9% Heterosexual	100% Transgender Woman	Involvement in the Trans Community	Incidence of HIV/STI	-0.14
15. Ruben et al.						Total # of Diagnoses	0.02
						Overall Physical Health	0.14

26. St. Pierre	2018	212	100% Lesbian	100% Unspecified Woman	Global Outness	Engagement in Preventative Health Measures	0.24
27. Steele et al.	2006	489	100% Lesbian	100% Unspecified Woman	Outness about Lesbian Identity	Health Status	-0.04
28. Tylka & Andorka	2012	346	100% Gay	100% Unspecified Man	Gay Community Involvement	Disordered Eating Behaviors	-0.09
Utilization of Health Services							
29. Anderson-Carpenter et al.	2018	1729	68.35% Gay, 31.65% Bisexual/Pansexual	100% Unspecified Man	Community Connectedness	Regular Health Care Provider	0.01
30. Fisher et al.	2018	198	82.8% Gay, 15.6% Bisexual/Pansexual, 1.5% Other	100% Cisgender Man	Outness to Parents	Discussing HIV Prevention with Healthcare Provider	0.01
						Lifetime HIV Testing	0.12
31. Holtzman et al.	2016	161	100% MSM	100% Cisgender Man	Gay Community Integration	HIV Testing	-0.27
9. Hotton et al.	2018	628	100% MSM	100% Cisgender Man	Gay Community Closeness	Knowledge of PrEP	0.12
						Participation in HIV Prevention Program	0.16

24. McGarrity et al.					Outness	Doctor Visits	-0.03
32. McNair et al.	2018	521	57% Lesbian, 36.1% Bisexual, 6.9% Other	91.9% Cisgender Woman, 1.5% Transgender Woman, .2% Transgender Man, 6.3% Gender Fluid/Genderqueer	LGBT Community Connectedness	Utilization of medical services	0.026
27. Steele et al.						Health Care Use	0.04

Note. Table is organized alphabetically by author and by health outcome.

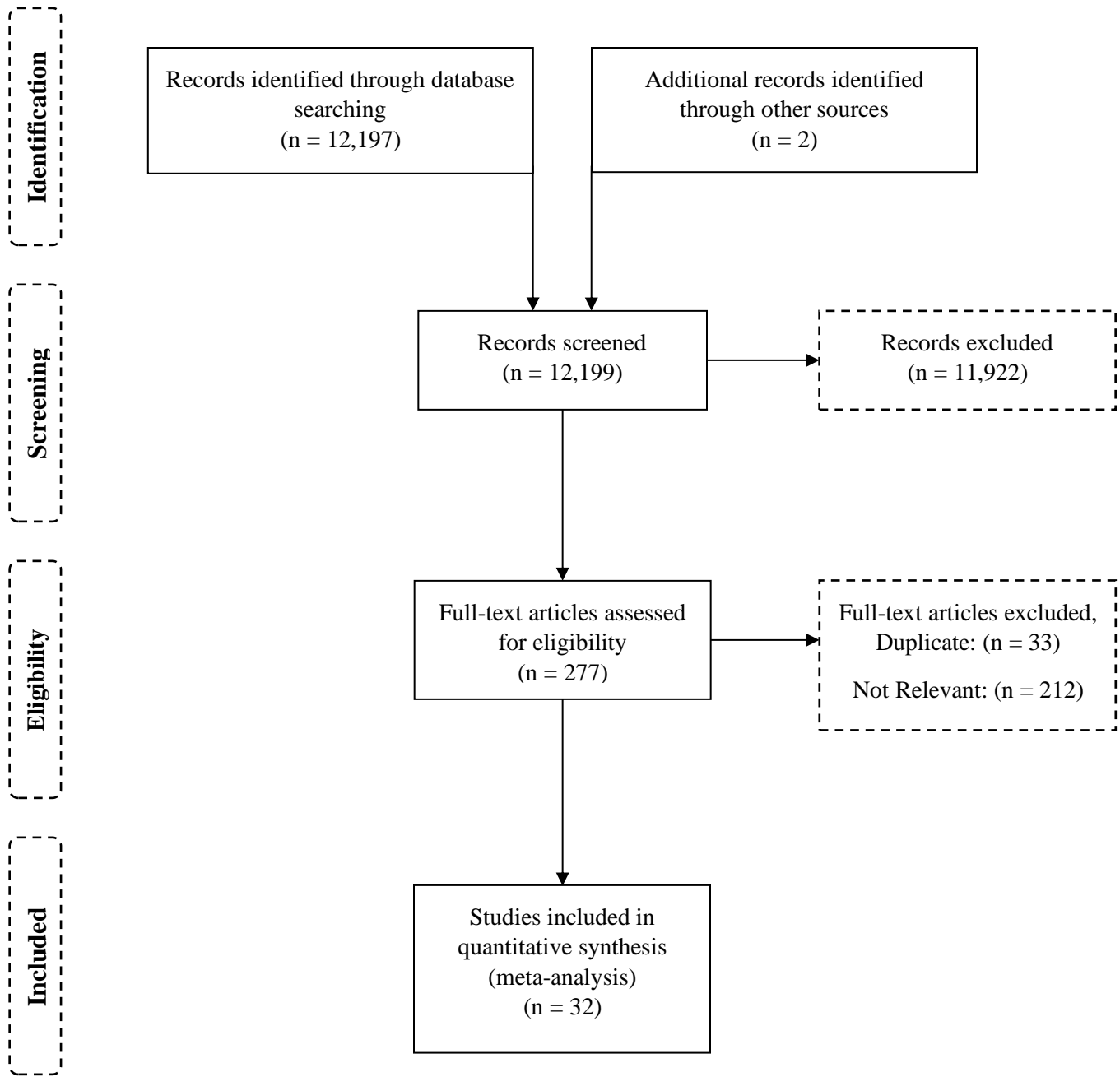


Figure 1. Study Consort Diagram.

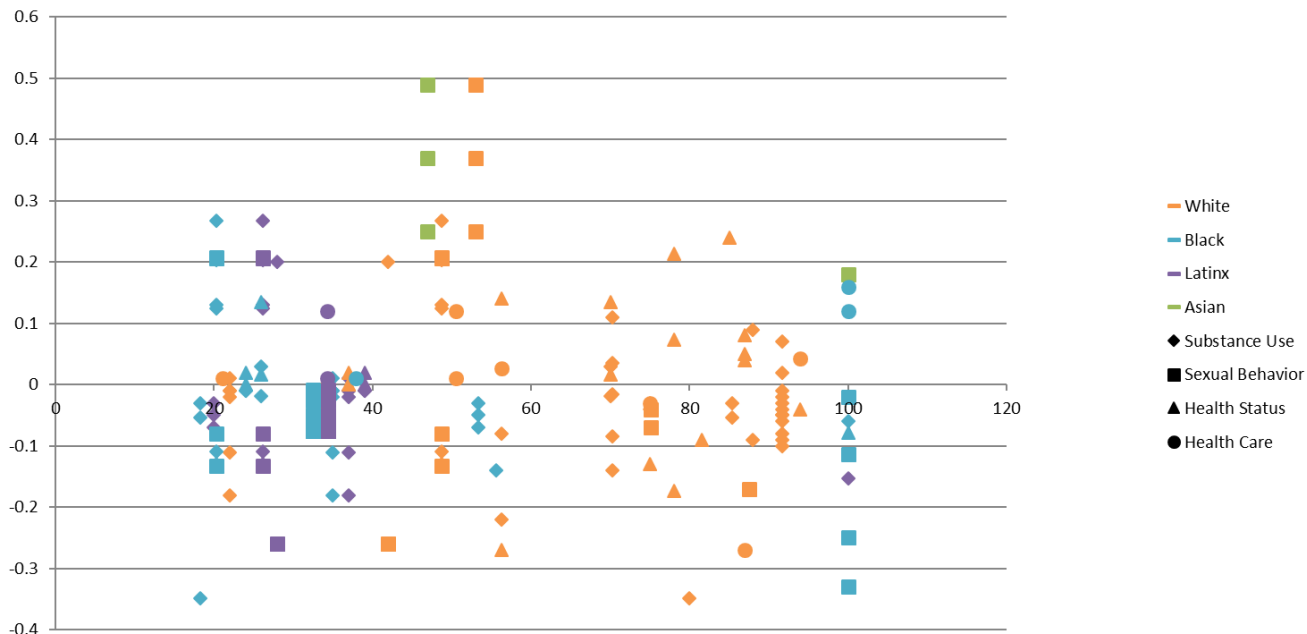


Figure 2. Effect sizes for all health outcomes by race.

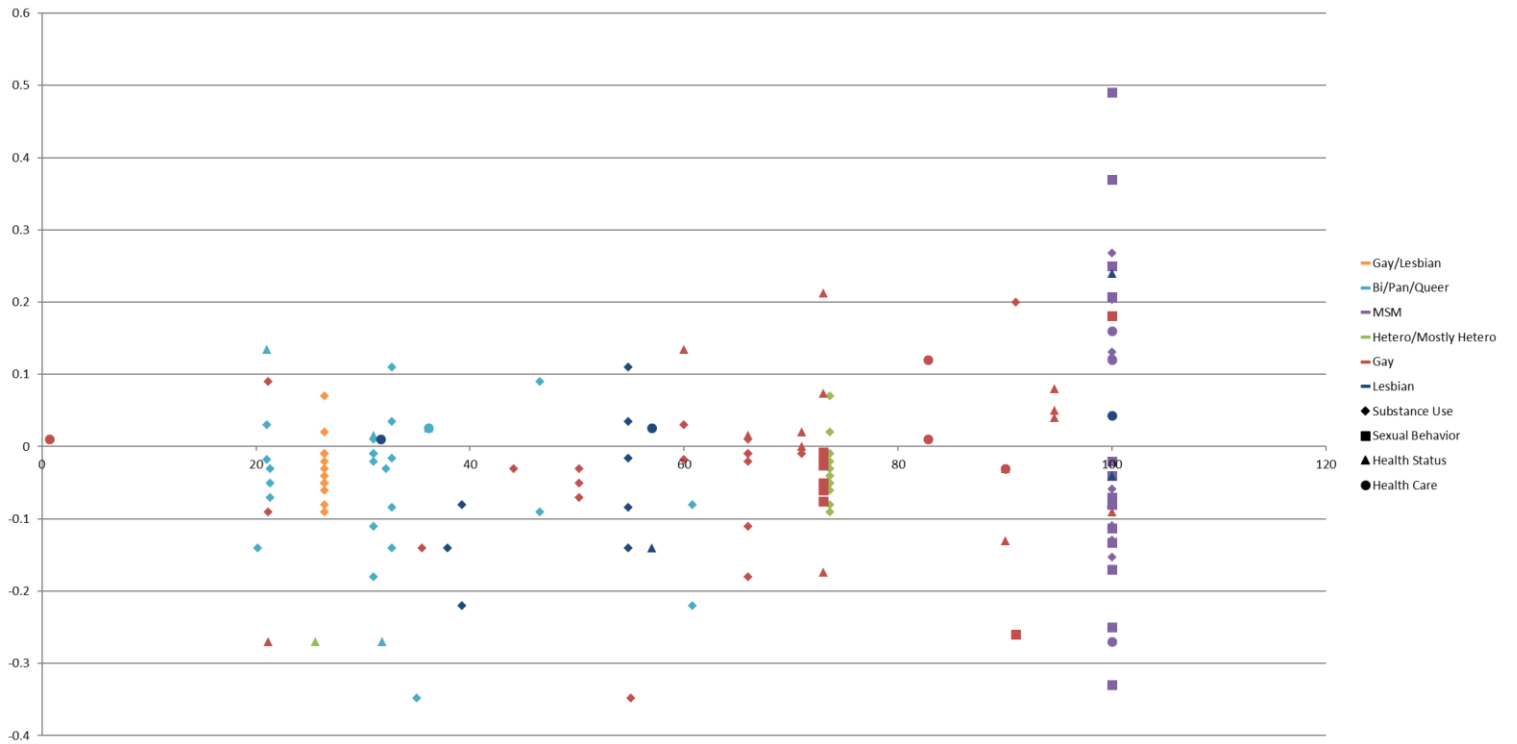


Figure 3. Effect sizes for all health outcomes by sexual orientation.

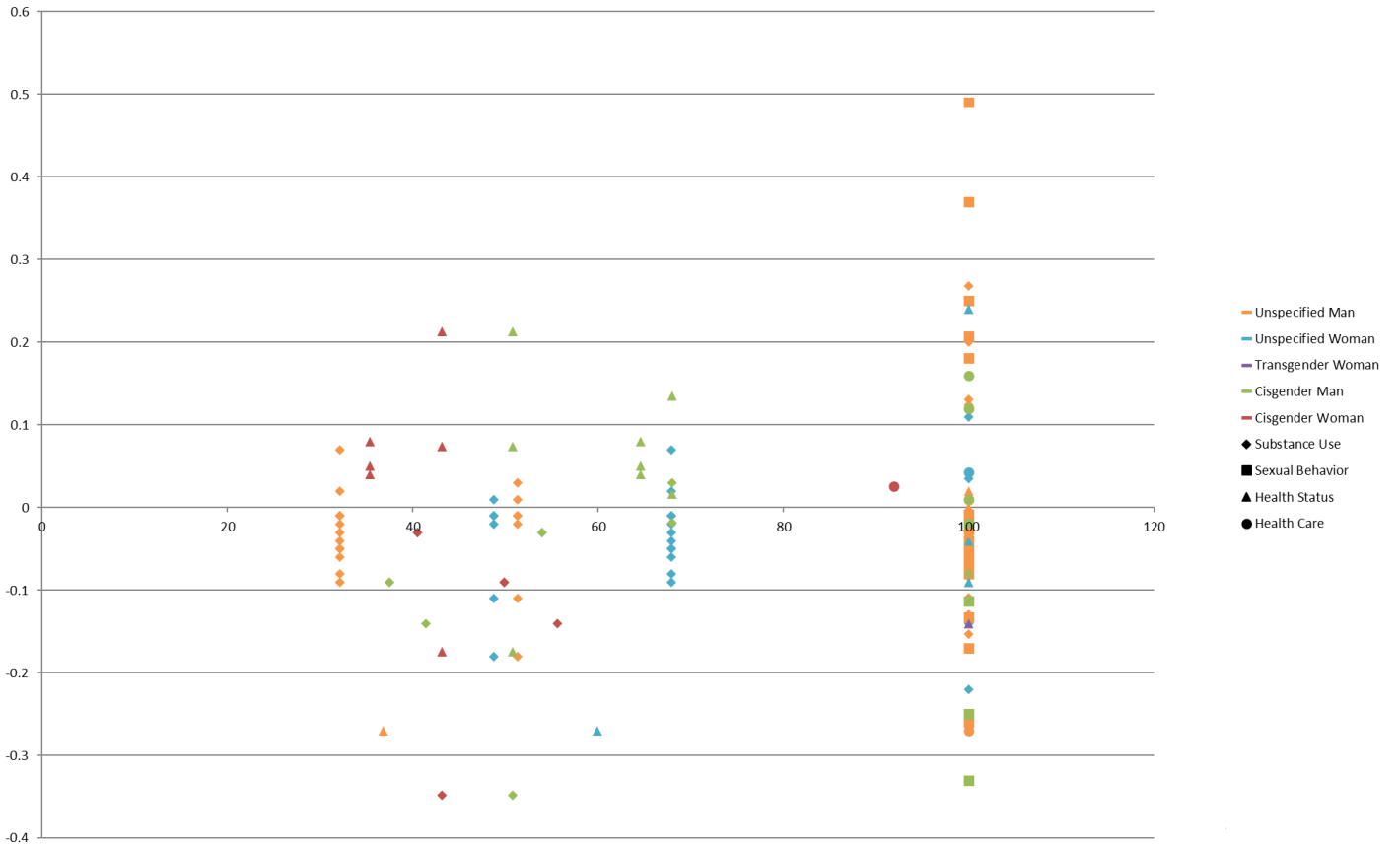


Figure 4. Effect sizes for all health outcomes by gender identity.

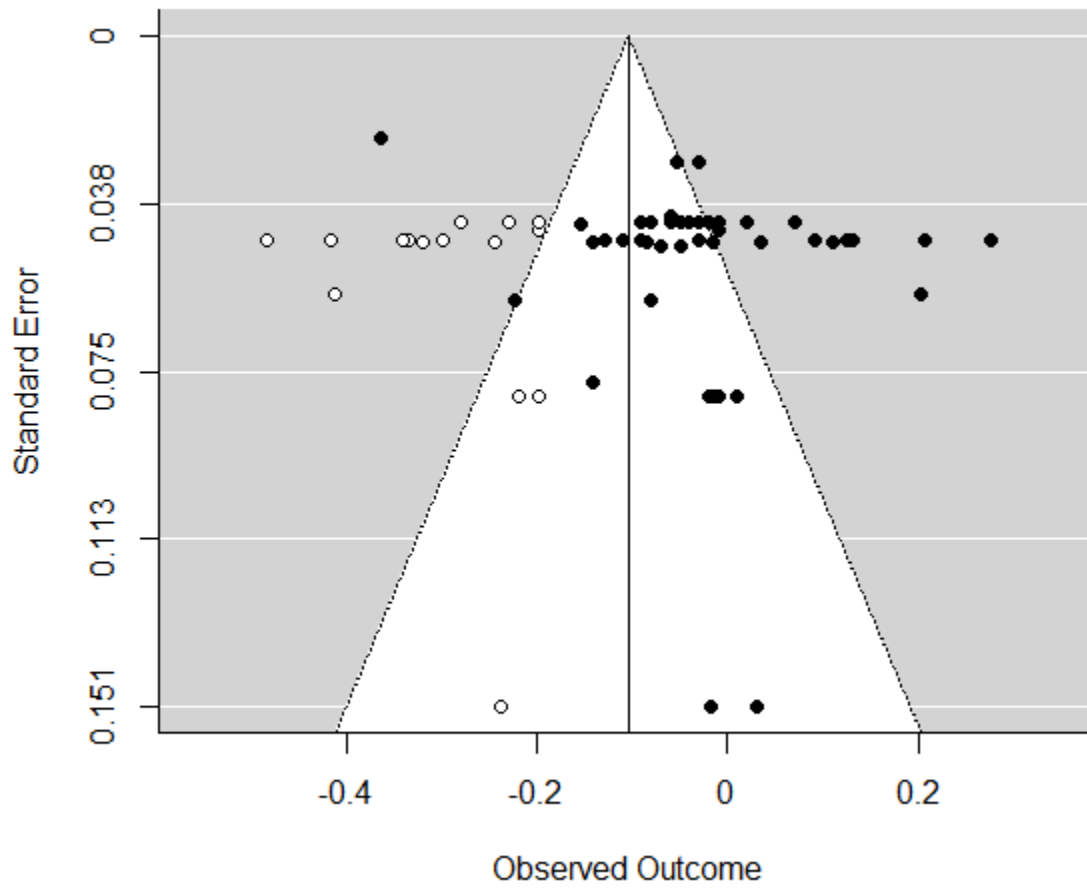


Figure 5. Trim and fill plot for the relationship between community identification and substance use.

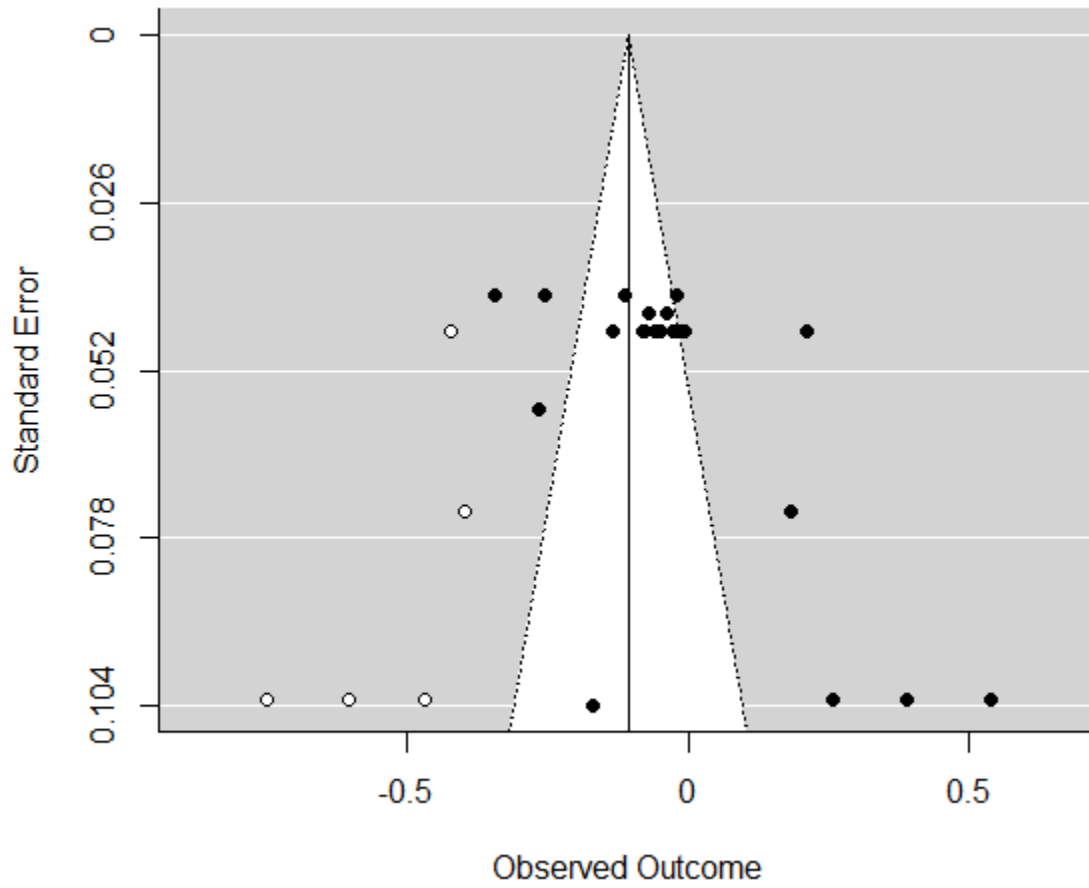


Figure 6. Trim and fill plot for the relationship between community identification and sexual behavior.

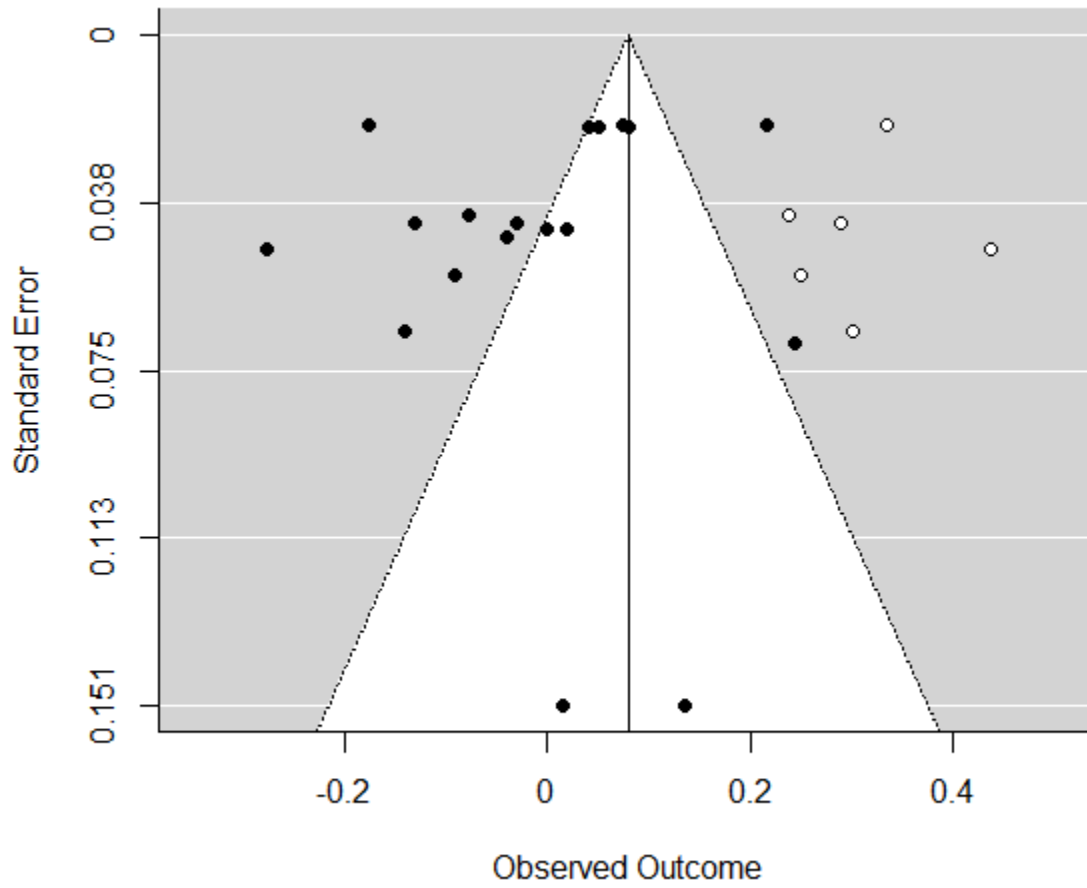


Figure 7. Trim and fill plot for the relationship between community identification and health status.

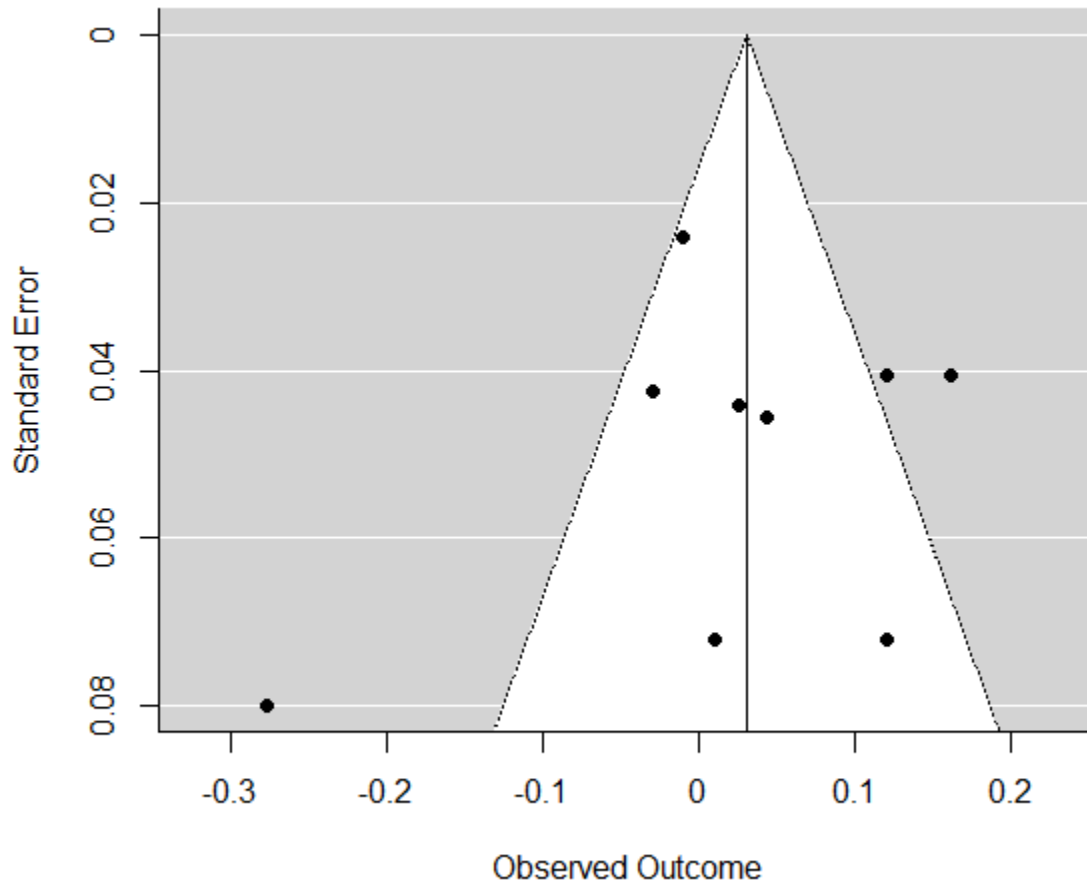


Figure 8. Trim and fill plot for the relationship between community identification and utilization of health services.

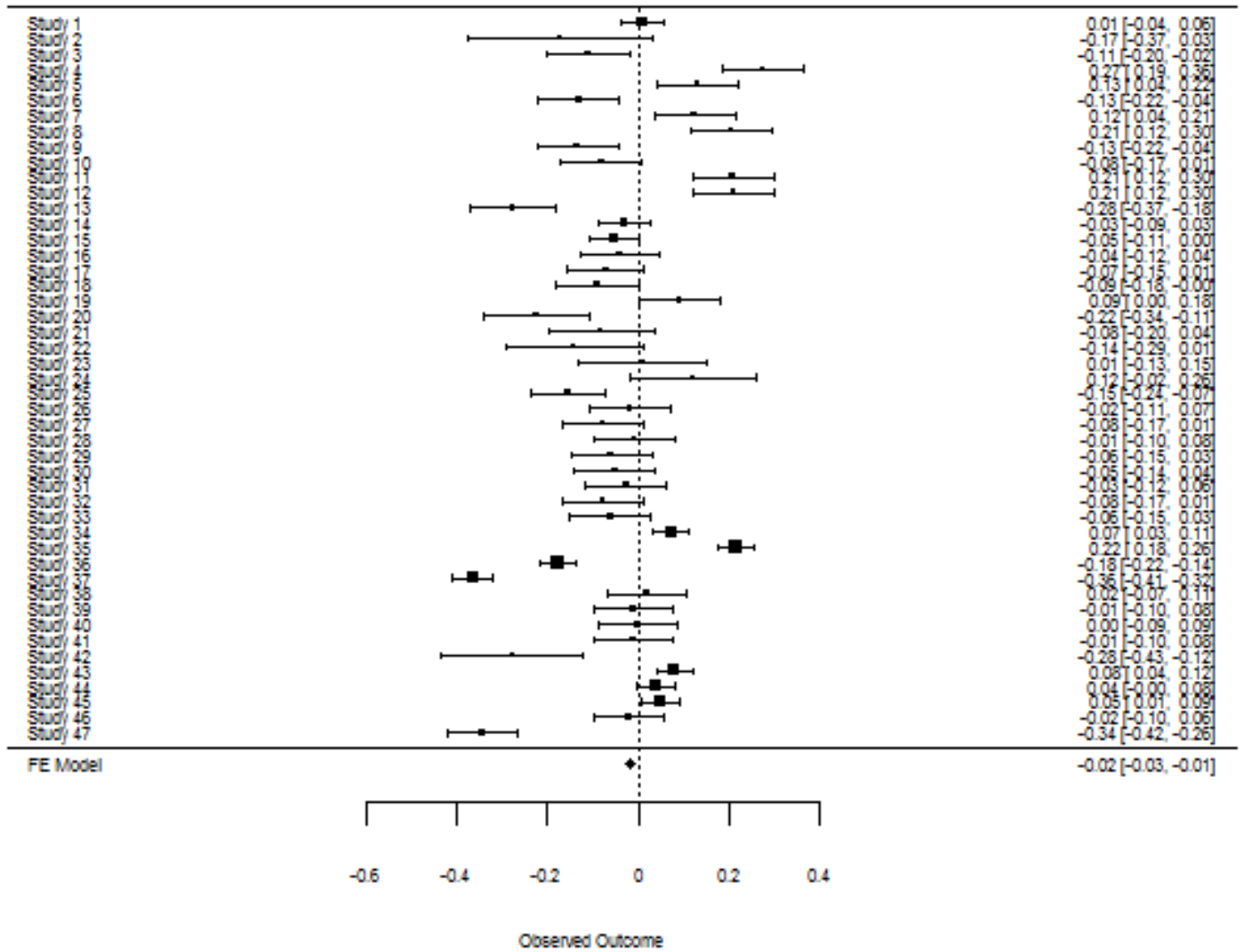


Figure 9. Forest plot of the effect sizes of the relationship between community identification and substance use.

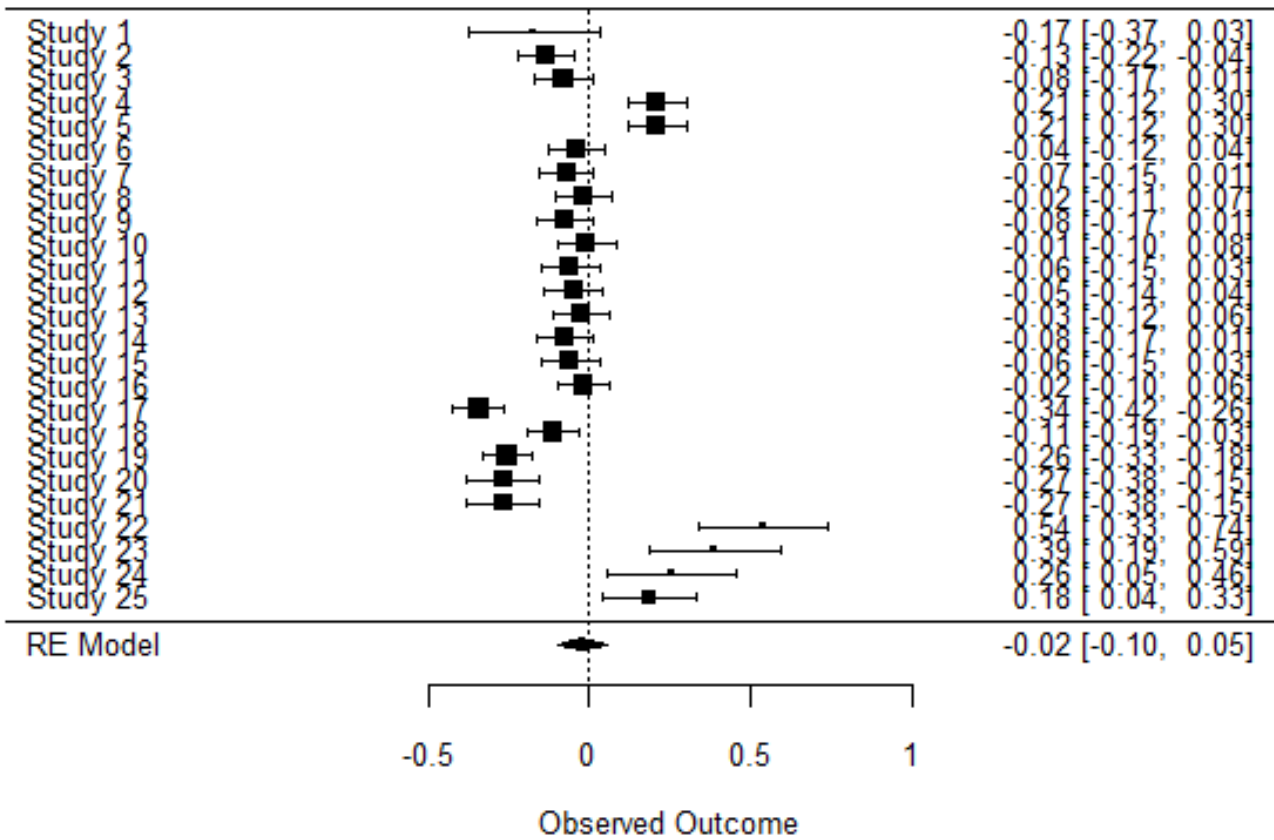


Figure 10. Forest plot of the effect sizes of the relationship between community identification and sexual behavior.

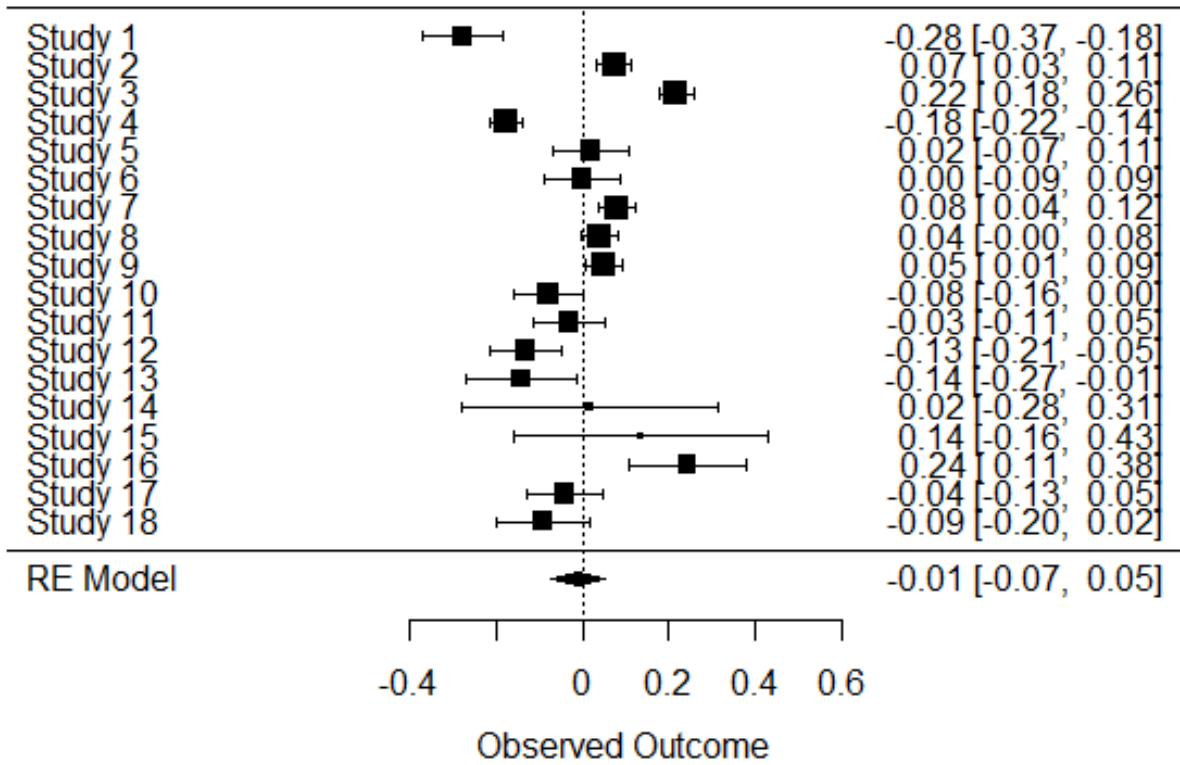


Figure 11. Forest plot of the effect sizes of the relationship between community identification and Health Status.

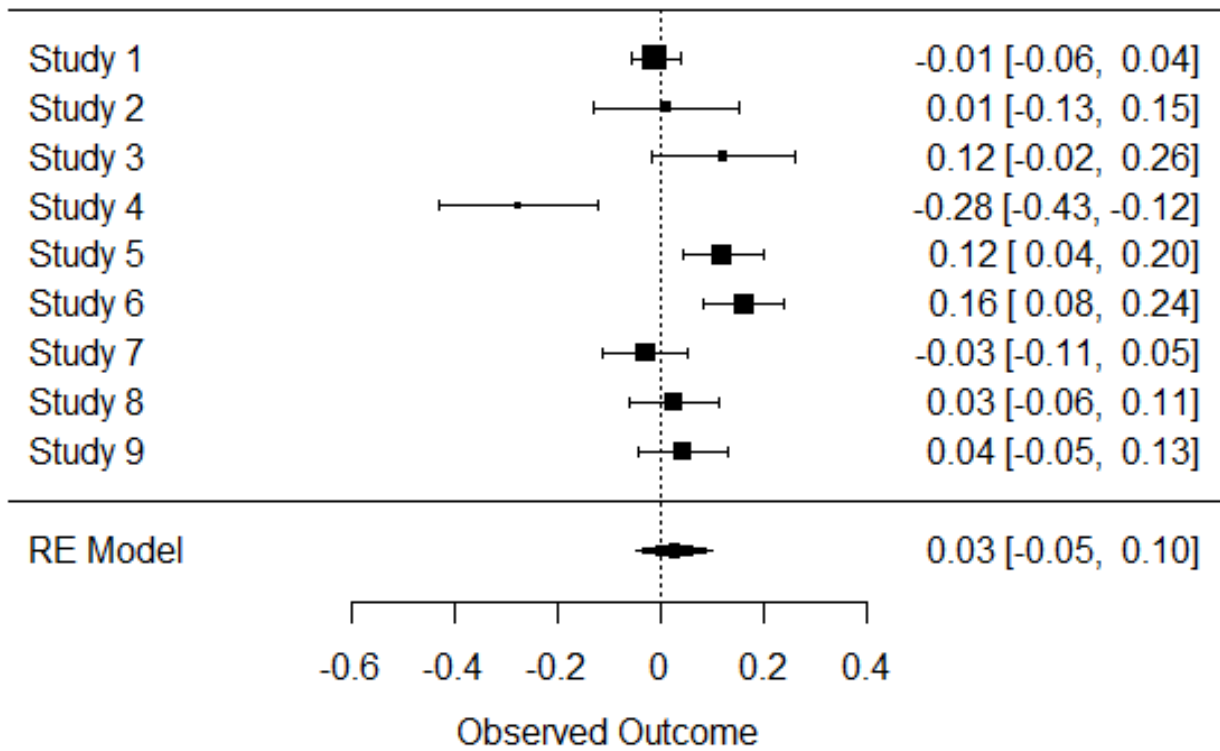


Figure 12. Forest plot of the effect sizes of the relationship between community identification and utilization of health services.

Appendix A

List of Keywords and Search Terms

Keywords and Search Terms for the Sample:

LGBT

LGBTQ

GLBT

LGB

Gay

Homosexual

Lesbian

Bisexual

Trans

Transgender

Queer

sexual minority

sexual minorities

same sex

same gender loving

men who have sex with men

MSM

women who have sex with women

WSW

Transexual

Transsexual

gender variant

gender non-conforming

non-binary

bisexuality

pansexual
homosexuality
lesbianism
gender identity
sexual orientation
gender fluid
gender fluidity

Keywords and Search Terms for Health:

Health
Healthy
physical health
health outcomes
health behaviors
health indicators
health disparities
illness
disease
mortality
smoking
substance use
substance abuse
addiction
alcoholism
alcohol use
physical activity
exercise
eating
nutrition
sexual behaviors

sexual risk taking
risky sex
condom use
medical adherence
medical services
compliance
medical access
heart disease
cardiovascular disease
HIV
AIDS
human immunodeficiency virus
HPV
STI
STD
sexually transmitted disease
sexually transmitted infection
cancer
stress response
cortisol
diurnal cortisol
blood pressure
immune
endocrine
HPA
allostatic load
Alzheimer's
cognitive decline
aging
dementia

UTI
urinary tract
kidney
kidney disease
kidney function
stroke
diabetes
cardiovascular
telomere
biomarker
vagal tone
heart rate variability
inflammation
inflammatory
arthritis
hypertension

Original Keywords and Search Terms for Identification with the LGBTQ Community*:

gay community connection
community integration
community involvement
self-disclosure
gay neighborhood
social identification
community connectedness
community participation
LGBT community
LGBT community connections
community support
social integration

community group identification

community

participation

involvement

connection

connectedness

*The original list of search terms for identification with the LGBTQ community proved to be too broad and was resulting in a large number of irrelevant articles. The list of search terms was modified for study relevance.

Modified Keywords and Search Terms for Identification with the LGBTQ Community:

Community connectedness

Community involvement

Community participation

Self-disclosure

Appendix B

List of Planned Outreach Approaches

In addition to standard computerized searches for relevant research articles, a number of planned outreach approaches will be utilized to identify studies that may have been missed in the initial study identification process.

Listservs. Emails will be sent to listservs of relevant organizations to ask researchers if they have data to contribute to the study. A template of the message that will be sent to relevant listservs can be found in Appendix E.

Public access data. Websites for large scale health organization including the World Health Organization and the Center for Disease Control and prevention will be explored for public access health data that may pertain to this project.

Contacting researchers directly. There are multiple researchers who were referenced numerous times in the literature review portion of this paper because their research area of interest is directly relevant to the topic of this study. These researchers will be emailed directly to see if they have any unpublished data that they would be willing to contribute to the meta-analysis. The email template that will be used to contact each researcher can be found in Appendix F.

Appendix C

CODING MANUAL

Adapted from Lipsey & Wilson (2001)

STUDY-LEVEL CODING MANUAL

Inclusion Criteria

For identification or definitions of these criteria, please see the previous section.

1. Do these data include an LGBTQ sample? Indicate whether the sample consists of LGBTQ individuals. This can be expressed through a self-report measure where the participants report sexual orientation/gender identity, or it can be reported by the researcher. Use a Y (yes) or an N (no) to indicate whether the data were collected from an LGBTQ sample. If yes, proceed to the next question. If no, do not continue to code these data.
2. Do these data include a measure of identification with the LGBTQ community? Indicate whether the data contain one or more measures of identification with the LGBTQ community. Identification with the LGBTQ community may be expressed by responses to a single-item question or a community identification measure. Use a Y (yes) or an N (no) to indicate whether the data include one or more question or measure pertaining to LGBTQ community identification. If yes, proceed to the next question. If no, do not continue to code these data.
3. Do these data include one or more measures of indicators of physical health? Indicate whether the data contain one or more measures of physical health outcomes or physical health behaviors. Physical health measures may be self-report measures or physiological data. Use a Y (yes) or an N (no) to indicate whether the data include one or more measures of physical health. If yes, proceed to the next question. If no, do not continue to code these data.

Article Information

Bibliographic Reference: Write an APA citation for the dataset being examined

4. Study ID Number. Assign a unique identification number to each study. If a report presents two independent studies, i.e. two independent outcome studies with different participants, then add a decimal to the study ID number to distinguish each study within a report and code each independent study separately.
5. Type of publication. What type of publication is this report? If two separate reports are being used to code a single study, code the type of the more formally published report (i.e. book or journal article).

6. Publication Year. What is the publication year (last two digits; XX if unknown)? If two separate reports are being used to code a single study, code the publication year of the more formally published report.

Sample Descriptors

7. Mean and Standard Deviation of Age of Sample. Specify the approximate or exact mean age and standard deviation of the sample. Code the best information available. If mean age cannot be determined, enter “99.99.”
8. Percent Race/Ethnicity of Sample. Indicate percentages of each race identified within the sample. If any of the categories is not provided, put “NA.”
9. Country of Sample. Indicate the country in which the sample was collected. Country will be coded as U.S. or non-U.S. sample.
10. Percent Gender Identity of Sample. Indicate percentages of each gender identity identified within the sample. If any of the categories is not provided, put “NA.”
11. Percent Sexual Orientation of Sample. Indicate percentages of each sexual orientation identified within the sample. If any of the categories is not provided, put “NA.”
12. Socioeconomic Status of Sample. Indicate the way in which data presented information about SES (income, education level, subjective reports, etc) by checking the appropriate box. After indicating how SES was addressed, report the percent of each reported option from the reported SES identified within the sample. If any of the categories is not provided, put “NA.”
13. Relationship Status of Sample. Indicate percentages of each relationship status identified within the sample. If any of the categories is not provided, put “NA.”
14. Location of Data Collection. Indicate location of data collection to the extent that the information is provided. There will be fill in the blank options for country, state, city, and zip code of data collection location. If this information is not provided, put “N/A.” Following the fill in the blank location questions, indicate the percent of the sample that came from a rural area of small town, a suburban area, and an urban or metropolitan area.
15. Sample size. Indicate the size of the sample used in this study.

LGBTQ Sample Information

16. Quality of the assessment of an LGBTQ sample. Please indicate the number that corresponds with the quality categories provided. If the measure does not fall under any of the provided categories, please select N/A and give a brief explanation.

LGBTQ Community Identification Measure Information

17. Number of community identification measures. Indicate the number of measures within the study that pertain to participant identification with the LGBTQ community. If multiple LGBTQ community identification measures exist within a single study, repeat items 18 - 21 for each measure.
18. Number of scale items. Indicate the number of items in the scale assessing LGBTQ community identification.
19. Construct being assessed. Please indicate the construct the measure was designed to assess. A few examples of possible constructs are “connection with the LGBTQ community”, “LGBTQ community involvement”, or “LGBTQ identity disclosure.”
20. Measure of community identification. Give a brief description of measure of LGBTQ community identification. Please indicate the name of the measure, whether this is a normed measure that has been used in other literature, and briefly describe characteristics of the measure.
21. Measure attachment. Attach an image of the description of the measure from the method section of the article.
22. Quality of the assessment of LGBTQ community identification. Please indicate the number that corresponds with the quality categories provided. If the measure does not fall under any of the provided categories, please select N/A and give a brief explanation.

Indicator of Physical Health Measure Information

23. Number of physical health measures. Indicate the number of measures within the study that pertain to physical health. If multiple measures of physical health exist within a single study, repeat items 23 - 27 for each measure.
24. Self-report or physiological measure. Indicate if the physical health measure is self-report such as a Likert scale or a yes/no question, or a physiological measure such as a saliva sample or a blood pressure reading.
25. Number of scale items. Indicate the number of items in the scale assessing indicators of physical health.
26. Construct being assessed. Please indicate the construct the measure was designed to assess. A few examples of possible constructs are “HIV/AIDS status”, “weekly physical activity”, or “number of visits to the doctor in the last month.”

27. Measure of physical health. Give a brief description of measure physical health. Please indicate the name of the measure, whether this is a normed measure that has been used in other literature, and briefly describe characteristics of the measure.
28. Measure attachment. Attach an image of the description of the measure from the method section of the article.
29. Quality of the assessment of the indicator of physical health. Please indicate the number that corresponds with the quality categories provided. If the measure does not fall under any of the provided categories, please select N/A and give a brief explanation.

STUDY-LEVEL CODING FORM

Inclusion Criteria

- ___ 1. Does this study include an LGBTQ sample? Y/N
- ___ 2. Does this study include a measure of identification with the LGBTQ community?
Y/N
- ___ 3. Does this study include a measure of physical health? Y/N

Article Information

Bibliographic Reference:

- ____ 4.. Study ID Number
- __ 5.. Type of Publication
- | | |
|-----------------------|---------------------------|
| 1. Book | 4. Conference Paper |
| 2. Journal Article | 5. Unpublished Manuscript |
| 3. Thesis or Doctoral | 6. Unpublished Data |
| 4. Technical Report | 7. Other (Specify): _____ |
- __ 6. Publication Year (last two digits; XX if unknown) [PUBYEAR]

Sample Descriptors

- ___. / ___ 7. Mean Age [MEANAGE] / Standard Deviation [AGESD]
8. Percent Race/Ethnicity [RACE]
- | | |
|----------------------------------|---------------|
| 1. ___% White/ European American | 5. ___% Mixed |
| 2. ___% Black/ African American | 6. ___% Other |

- 3. ____% Latinx/Hispanic
- 4. ____% Asian/ Asian American
- 7. ____% Unknown

9. Percent Gender Identity [GENID]

- 1. ____% Cisgender women
- 2. ____% Transgender women
- 3. ____% Cisgender man
- 4. ____% Transgender man
- 5. ____% Other gender non-conforming
- 6. ____% Unknown

10. Country of Sample.

11. Percent Sexual Orientation [SEXORI]

- 1. ____% Gay
- 2. ____% Lesbian
- 3. ____% Bisexual/Pansexual
- 4. ____% Heterosexual
- 5. ____% Other sexual orientation
- 6. ____% Unknown

12. Socioeconomic Status of Sample.

- Income
- Education level
- Subjective report
- Other: _____

Percent of each option within the reported income category, or mean and standard deviation if provided:

- 1. ____% _____
- 2. ____% _____
- 3. ____% _____
- 4. ____% _____
- 5. ____% _____
- 6. ____% _____
- 7. ____% _____

13. Relationship Status of Sample.

- 1. ____% Single
- 2. ____% Casually dating
- 3. ____% Partnered
- 5. ____% Other: _____

4. ____% Cohabiting/married

14. Location of Data Collection.

Country: _____ State: _____

City: _____ Zip Code: _____

1. ____% Rural/ small town
2. ____% Suburban
3. ____% Urban/ metropolitan

Other location information:

15. Sample size: _____

LGBTQ Sample Information

16. Quality of the assessment of an LGBTQ sample.

- 1) Researchers indicate data were collected from an LGBTQ sample but do not provide a breakdown of the sample by sexual orientation and/or gender identity.
- 2) Researchers indicate data were collected from an LGBTQ sample but combine demographic categories. For example, researchers combine lesbian and bisexual women into one category such as lesbian/bisexual women or women loving women (WLW) rather than considering lesbian and bisexual women to belong to two distinct sexual orientation categories.
- 3) Researchers indicates data were collected from an LGBTQ sample and provides a break down of the sample by sexual orientation and/or gender identity.
- 4) Participants indicate sexual orientation/ gender identity in a demographic question.

- 5) Participants indicate sexual orientation/gender identity by responding to a non-demographic measure. This may include a fill in the blank question, a single item measure, or an established measure of sexual orientation/gender identity such as the Kinsey Scale or the Klein Grid.

_____ If participants indicated sexual orientation by responding to a non-demographic measure, indicate the number of scale items.

_____ If participants indicated sexual orientation by responding to a non-demographic measure, indicate if the measure used is a normed measure that has been used in other studies.

If participants indicated sexual orientation by responding to a non-demographic measure, briefly describe the structure of the question(s) and attach a picture of the measure with the page number.

LGBTQ Community Identification Measure Information

6) Number of community identification measures. _____

7) Number of scale items. _____

8) Construct being assessed.

9) Measure of community identification.

10) Measure attachment.

11) Quality of the assessment of LGBTQ community identification. Please circle the number that best describes the quality of the assessment used. If

- 1) This measure assessed whether the participant interacted with an LGBTQ bar/parade/website/other LGBTQ specific space
- 2) This measure was a yes/no question asking the participant if they identify with, or feel connected to the LGBTQ community
- 3) This measure was a single item measure (such as a Likert scale) asking the participant the extent to which they identify with, or feel connected to the LGBTQ community
- 4) This measure used multiple items to assess the extent to which the participant identifies with, or feels connected to the LGBTQ community, but this is not a measure that has been validated or used in previous literature.
- 5) This measure used multiple items to assess the extent to which the participant identifies with, or feels connected to the LGBTQ community and is a validated measure that has been used in previous literature.

N/A) This measure does not fall under any of the provided categories. Provide a brief explanation of the measure.

Indicator of Physical Health Measure Information

12) Number of physical health measures. _____

13) Self-report or physiological measure. _____

14) Number of scale items. _____

15) Construct being assessed.

16) Measure of physical health indicator.

17) Measure attachment.

18) Quality of the assessment of the indicator of physical health. Please circle the number that best describes the quality of the assessment used. If

- 1) This measure was a subjective report of physical health provided by the participant
- 2) This measure was a checklist of diagnoses filled out by the participant
- 3) This measure was a health report provided by a doctor who examined the participant
- 4) This measure was a review of a copy of the participant's medical records
- 5) This was a physiological measure assessing the participant's health. This could be a sample of biological matter such as saliva, urine or blood; a physiological measure such as heart rate or blood pressure; or some other physical measure taken by the researchers for the purpose of this study.

N/A) This measure does not fall under any of the provided categories. Provide a brief explanation of the measure.

EFFECT SIZE LEVEL CODING MANUAL

1. Study ID number. Identification number assigned to the study from which this effect size came.
2. Effect size number. There may be multiple effect sizes within a single set of data. Because of this, it is important to label each effect size within a single study with a sequential number. For example, the first effect size that you code from a study would receive a label of “1,” the second effect size you code from that same study would receive the label of “2” and so on. If a study one contains one effect size, that effect size would also receive a label of “1.”

Effect Size Data

3. Type of data effect size is based on. Indicate the provided data from which you will calculate the effect size.
4. Page number where the data for this effect size was found. Indicate the page number in the journal/book/document where the effect size can be found.
5. LGBTQ community identification mean and standard deviation. Indicate the mean and standard deviation for the measure of LGBTQ community identification. If multiple measures of LGBTQ community identification are in the same article, repeat for each measure.
6. Indicator of physical health mean and standard deviation. Indicate the mean and standard deviation for the measure of indicator of physical health. If multiple measures of indicators of physical health are in the same article, repeat for each measure.

Calculated Effect Size

7. Calculate the effect size from the provided information. Indicate that measures the effect size is derived from. If multiple effect sizes can be calculated from the same set of data, repeat for each possible effect size.
8. Number of cases. Indicate the number of cases on which this effect size is based.
9. Confidence rating in effect size computation. Indicate the extent to which the effect size had to be estimated from the information provided.
 - 1) The effect size is highly estimated. This means the effect size was calculated using imprecise estimates, such as p values and sample size.
 - 2) The effect size required some estimation. This means bivariate correlations were not provided and the effect size was calculated using some estimation.
 - 3) The effect size is not estimated. This means the effect size was calculated directly from a correlation matrix, bivariate correlations provided, or enough information was available to calculate an effect size with full confidence.

EFFECT SIZE LEVEL CODING FORM

____ 1. Study ID number.

__ 2. Effect size number.

Effect Size Data

3. Type of data effect size is based on.

___ Bivariate correlation

___ Partial correlation

___ Frequency Data

___ Group Comparisons

___ Other inferential/descriptive statistics: _____

4. Page number where the data for this effect size was found. _____

5. LGBTQ community identification mean and standard deviation.

Mean: _____ SD: _____

6. Indicator of physical health mean and standard deviation.

Mean: _____ SD: _____

Calculated Effect Size

7. Report effect size. _____

8. Number of cases on which effect size is based. _____

9. Confidence rating in effect size computation. Circle the appropriate confidence rating.

1 2 3

Appendix D
Request for Correlations Email Template

Dear _____,

I am a graduate student writing a master's thesis on the topic of physical health and community identification among members of the LGBTQ community. For my thesis, I am conducting a meta-analysis of previous research on this topic. I came across your paper _____[Paper Title Here]_____ in my meta-analysis search and would like to include it in my study if at all possible. I was unable to find the information I need to calculate the appropriate effect sizes to include your work in my thesis. I was wondering if you would be able to provide me with a correlation matrix of the variables used in your paper or a copy of the data so I could calculate the effect size(s) I also need to know the number of cases on which each correlation is based. The relationships I am particularly interested in are the correlations between _____[Correlations of Interest Here]_____. Ideally, I would like separate correlations for the _____ & _____ members of your sample. I think your research could be extremely valuable to my project and I would be thrilled at the opportunity to include it.

Thank you very much for your time,

Kendall Lawley

Advised by Dr. Barbara Lehman

Appendix E
Listserv Email Template

Dear colleagues,

I am a graduate student conducting a meta-analysis on the relationship between connectedness to the LGBTQ community and indicators of physical health for my master's thesis. I am currently seeking in press and unpublished manuscripts to add to the studies that I will include in this project. My inclusion criteria are that studies must use a sample of LGBTQ identifying individuals, they must include at least one measure of identification with, or connection to, the LGBTQ community, and they must include at least one indicator of physical health (self-report or physiological). Please email me at lawleyk@wwu.edu if you have any data sets or manuscripts that you feel might be relevant to this project and I would be happy to provide you with more information.

Additionally, please feel free to forward this message to any colleagues who you believe may have relevant data that could be utilized for this study.

Thank you very much for your time,

Kendall Lawley

Advised by Dr. Barbara Lehman

Appendix F

Request for Relevant Data Email Template

Dear _____,

I am a graduate student writing a master's thesis on the topic of physical health and community identification among members of the LGBTQ community. For my thesis, I am conducting a meta-analysis of previous research on this topic. I have read a number of your papers and your research seems to be closely related to this topic. I wanted to reach out to see if you have any relevant data that you would be willing to share with me for my thesis. I am interested in exploring the relationship between some measure(s) of personal identification with the LGBTQ community and some measure(s) of physical health for LGBTQ identifying individuals. I am conceptualizing both LGBTQ community identification and physical health quite broadly, so a variety different measures would be usable for this project. Please let me know if you are willing to share and data you have that you think could be relevant to this topic and I would be happy to provide you with more specific information.

Thank you very much for your time,

Kendall Lawley

Advised by Dr. Barbara Lehman