Exploring mental health, cognition, and sexual orientation: Advancing health equity through the CLSA

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Social Sciences and Humanities Research Council of Canada

Overview

1) Mental Health during the COVID-19 Pandemic

2) Social Networking Sites and Mental Health

3) Cognition and Social Determinants

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Mental Health during the COVID-19 Pandemic

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Mental Health and the COVID-19 Pandemic

- In the general population, the pandemic was associated with significant levels of **psychological distress** and higher rates of **mental health concerns** such as anxiety and depression
- In comparison to pre-pandemic times, **older adults** reported **greater loneliness and depression symptoms**
- In comparison to non-LGB people, **LGB people** reported **worse mental health** during the pandemic

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While there was separate research on older adults and LGB adults,

few studies looked at the mental health of LGB older adults

Research Questions

- How did **depression** and **loneliness** scores change over the course of the pandemic, and did this differ by sexual orientation?

- Is there a **significant difference** in the depression and loneliness **trajectories** of older LGB people in comparison to heterosexual people (i.e., an interaction effect of LGB*Time)?

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Data Source

- CLSA data from **four** time points:
  - **Baseline** (2011-2015)
  - **Follow-up 1** (2015-2018)
  - **COVID-19 Time 1** (Apr-May 2020)
  - **COVID-19 Time 2** (Sept-Dec 2020)

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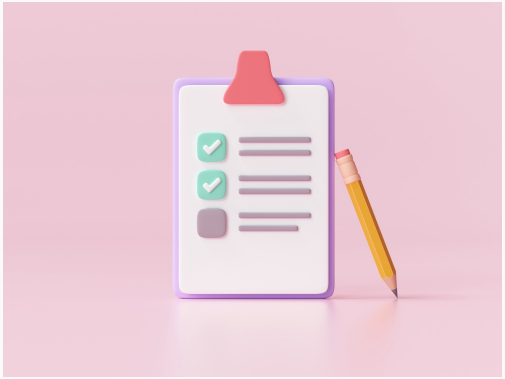
Measures

- **Outcomes**
  - Depressive symptoms (CESD-10), 4 time points
  - Loneliness (UCLA 3-item), 2 time points
- **Explanatory variables**
  - Sexual orientation
  - Covariates (sex, income, education, race/ethnicity)



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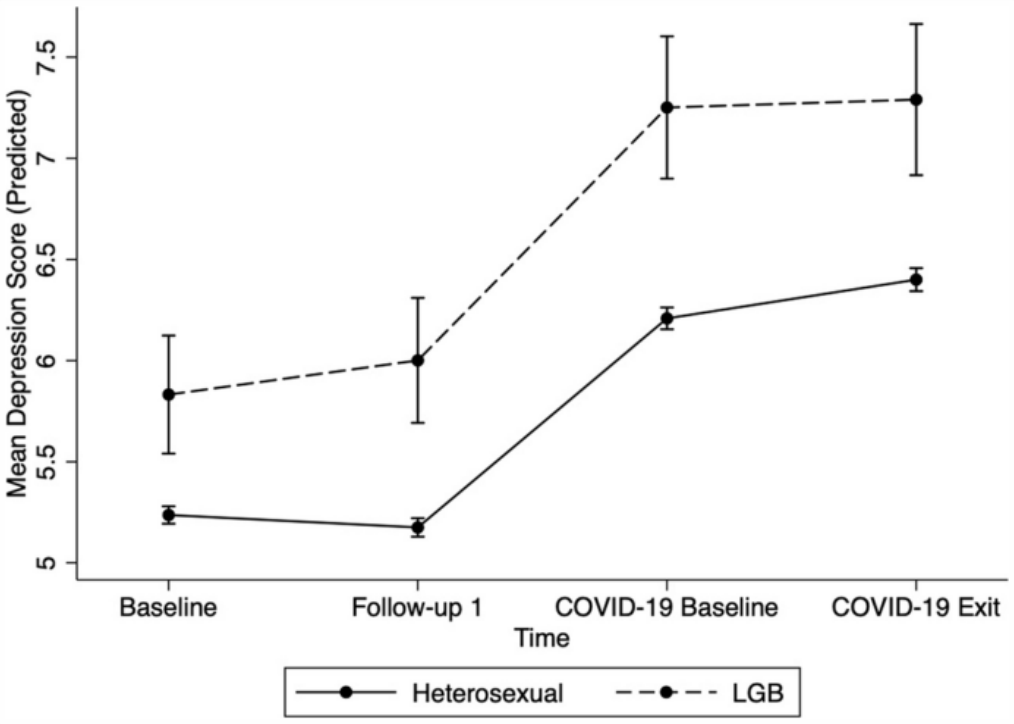
Statistical Analysis

- **Descriptive** statistics (means, standard deviations)
- **Generalized Estimating Equations** (GEE)

- **Analytic sample**
- Depression model: n=47,728
- Loneliness model: n=41,698
- Approximately 2% LGB

Results: Depression Scores by Sexual Orientation



Results: Depression Scores by Sexual Orientation

- Participants overall reported **more depression symptoms during the COVID-19 time points** in comparison to baseline (Time 1: *B*=1.0, *p*<.001; Time 2: *B*=1.2, *p*<.001)
- **LGB participants** reported **more depression symptoms** in comparison to heterosexual participants after controlling for covariates (*B*=0.6, *p*<.001)
- The **interaction** between time and sexual orientation was **not statistically significant** (i.e., LGB and heterosexual groups worsened at similar rates)

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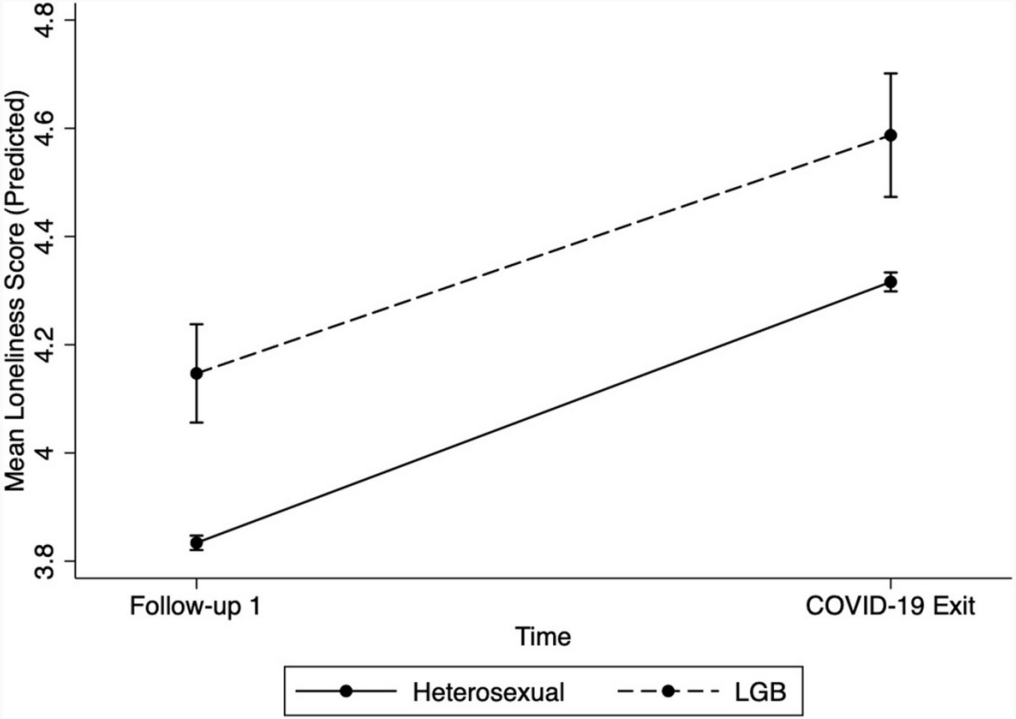
Results: Loneliness Scores by Sexual Orientation



Results: Loneliness Scores by Sexual Orientation

- Participants overall reported **more loneliness during COVID-19** than before the pandemic (*B*=0.5, *p*<.001)
- **LGB participants** reported **more loneliness** in comparison to heterosexual participants after controlling for covariates (*B*=0.3, *p*<.001)
- The **interaction** between time and sexual orientation was **not statistically significant** (i.e., LGB and heterosexual groups worsened at similar rates)

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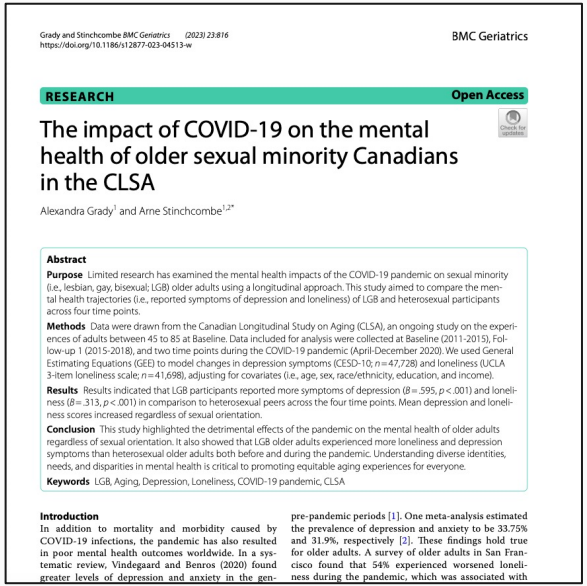
Key Takeaways

- **LGB** participants reported **more depression symptoms and loneliness across all time points** in comparison to heterosexual participants
- **Mental health worsened** during the COVID-19 pandemic, **regardless of sexual orientation**
- **Mental heath trajectories did not differ** significantly by sexual orientation



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RESEARCH Open Access

The impact of COVID-19 on the mental health of older sexual minority Canadians in the CLSA

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Abstract

Purpose Limited research has examined the mental health impacts of the COVID-19 pandemic on sexual minority (i.e., lesbian, gay, bisexual; LGB) older adults using a longitudinal approach. This study aimed to compare the mental health trajectories (i.e., reported symptoms of depression and loneliness) of LGB and heterosexual participants across four time points.

Methods Data were drawn from the Canadian Longitudinal Study on Aging (CLSA), an ongoing study on the experiences of adults between 45 to 85 at Baseline. Data included for analysis were collected at Baseline (2011-2015), Follow-up 1 (2015-2018), and two time points during the COVID-19 pandemic (April-December 2020). We used General Estimating Equations (GEE) to model changes in depression symptoms (CESD-10; $n = 47{,}728$) and loneliness (UCLA 3-item loneliness scale; $n = 41{,}698$), adjusting for covariates (i.e., age, sex, race/ethnicity, education, and income).

Results Results indicated that LGB participants reported more symptoms of depression ($\beta = .595$, $p < .001$) and loneliness ($\beta = .313$, $p < .001$) in comparison to heterosexual peers across the four time points. Mean depression and loneliness scores increased regardless of sexual orientation.

Conclusion This study highlighted the detrimental effects of the pandemic on the mental health of older adults regardless of sexual orientation. It also showed that LGB older adults experienced more loneliness and depression symptoms than heterosexual older adults both before and during the pandemic. Understanding diverse identities, needs, and disparities in mental health is critical to promoting equitable aging experiences for everyone.

Keywords LGB, Aging, Depression, Loneliness, COVID-19 pandemic, CLSA

Introduction

In addition to mortality and morbidity caused by COVID-19 infections, the pandemic has also resulted in poor mental health outcomes worldwide. In a systematic review, Vindegaard and Benros (2020) found greater levels of depression and anxiety in the gen- pre-pandemic periods [1]. One meta-analysis estimated the prevalence of depression and anxiety to be 33.75% and 31.9%, respectively [2]. These findings hold true for older adults. A survey of older adults in San Francisco found that 54% experienced worsened loneliness during the pandemic, which was associated with

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Resilience Among LGB Communities

- While aspects of the pandemic (e.g., lockdowns) may have **amplified isolation** by closing affirming spaces, this may have also **limited exposure to discrimination**

- Qualitative studies during the pandemic highlighted the **resilience** of older LGB communities, many of whom **adapted to new technologies** to stay in touch with friends and chosen family (e.g., Westwood et al., 2021)

Social Networking Sites (SNS) and Mental Health

Older Adults and Social Networking Sites (SNS)

- **6 out of 10** Canadians **ages 50-64** and **1 in 3** Canadians ages **65+ use social media regularly**
- **Older adults use SNS for a variety of reasons**, including connecting with friends, keeping in touch with family, and making new friends

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What is social support?

- The **availability of others** who can provide various forms of support, including **emotional, informational, and tangible** (e.g., financial) support
- **Social support** is an important predictor of **mental health** in older adults
- **SNS use** may be a way for older adults to **increase social support**

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Mental Health and SNS

- SNS can help provide **social support** regardless of geographic location
- **Research is mixed** on the **relationship between mental health and SNS use in older adults:**
  - Some studies have found that SNS use has a **negative impact** on mental health (e.g., higher symptoms of depression)
  - Some studies have found that SNS use has a **positive impact** on mental health (e.g., fewer depression symptoms, decreased loneliness, and better self-reported well-being)

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Sexual Orientation and SNS

- Since its development, the Internet has provided **anonymous** forums for **connection, support, and partner-seeking** through chatrooms and classifieds
- In an era when sexual minority communities faced significant **social stigma**, **the Internet was an important avenue for social support**
- Today, **LGB adults** have **greater odds of having a social media account** than heterosexual adults
- SNS use **may have positive mental health impacts** on LGB people

Research Questions

- **How does SNS use compare** between LGB and heterosexual older adults?

- Is there a relationship between ***how* SNS is used** (e.g., to make new friends, to connect with family) and **mental health**? If so, does this **differ by sexual orientation**?

Method

- **Data Source**
  - CLSA Follow-up 1 (2015-2018)
- **Measures**
  - SNS use (next slide)
  - Depressive symptoms (CESD-10)
  - Loneliness (UCLA 3-item)
- **Explanatory variable:** sexual orientation
- **Covariates:** age, gender, income, education

CLSA SNS Use Questions

- “Do you currently use social networking sites on the Internet?” (Y/N)

- If **yes**, participants were asked if they used SNS to:
    1) make **new friends** (Y/N)
    2) stay in touch or make plans with **friends** (Y/N)
    3) stay in touch or make plans with **family** (Y/N)
    4) promote themselves or their **work** (Y/N)

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Statistical Analysis

- **Descriptive** statistics (means, standard deviations)
- **ANOVAs** for continuous variables and **chi-square tests** for categorial and binary variables
- **Logistic regression** to compute crude and adjusted **odds ratios**

- **Analytic sample:** n=21,836 (n=583 LGB)
  - Included only participants who answered “yes” to the question: “Do you currently use social networking sites on the Internet?”

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Results: Odds Ratios

- **LGB participants** had **greater odds of using SNS** in comparison to heterosexual participants (OR=1.29, p=.001)
- In comparison to heterosexual participants,
  - **LGB had higher odds of using SNS to make new friends** (OR=1.82, p<.001), and
  - **LGB had higher odds of using SNS to promote themselves or their work** (OR=1.34, p=.005)
  - There was no statistically significant difference in the odds of using SNS to stay in touch with friends or stay in touch with family

Results: Depressive symptoms

- There was an **interaction between LGB identity and using SNS to stay in touch with friends** (B=-1.23, p=.012)
  - **Using SNS to stay in touch with friends** as an **LGB** person was associated with **fewer depressive symptoms** than heterosexual people using SNS for this purpose
- There were no interactions between LGB identity and using SNS for other purposes (i.e., making new friends, staying in touch with family, or promoting self or work)

Results: Loneliness

- There was an **interaction between LGB identity and using SNS to make new friends** (B=0.44, p=.013)
  - **LGB** people who **used SNS to make new friends** reported **more loneliness** than heterosexual people using SNS for this purpose
- There were no interactions between LGB identity and using SNS for other purposes (i.e., staying in touch with friends, staying in touch with family, or promoting self or work)

Key Takeaways

- **Older LGB people** (not just younger cohorts) **are more likely to use SNS** than heterosexual people
- The impact of SNS on mental health **differs by sexual orientation and specific use of SNS:**
  - Using SNS **to stay in touch with friends** as an **LGB** person was associated with **fewer depressive symptoms** than heterosexual people who used SNS for this purpose
  - Using SNS **to make new friends** as an **LGB** person was associated with **more loneliness** than heterosexual people who used SNS for this purpose

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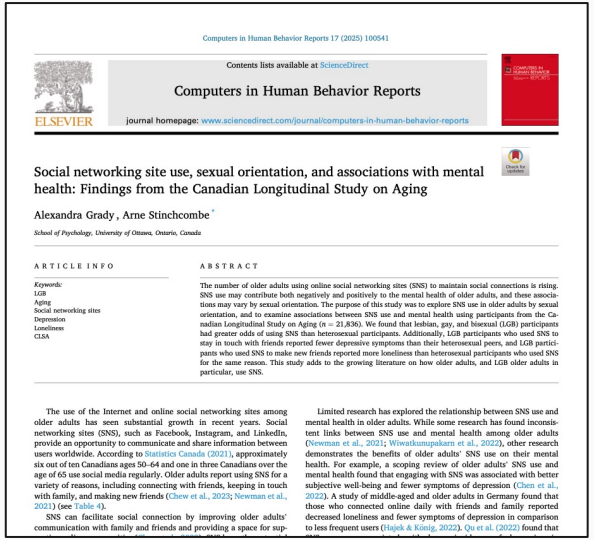
Key Takeaways

- **Online communities** may be **important avenues for social support and connection** between members of LGB communities

- It is possible that **using SNS to stay in touch with friends may be more beneficial** for mental health than using SNS to make new friends for LGB folks



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Social networking site use, sexual orientation, and associations with mental health: Findings from the Canadian Longitudinal Study on Aging

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ABSTRACT

The number of older adults using online social networking sites (SNS) to maintain social connections is rising. SNS use may contribute both negatively and positively to the mental health of older adults, and these associations may vary by sexual orientation. The purpose of this study was to explore SNS use in older adults by sexual orientation, and to examine associations between SNS use and mental health using participants from the Canadian Longitudinal Study on Aging (n = 21,836). We found that lesbian, gay, and bisexual (LGB) participants had greater odds of using SNS than heterosexual participants. Additionally, LGB participants who used SNS to stay in touch with friends reported fewer depressive symptoms than their heterosexual peers, and LGB participants who used SNS to make new friends reported more loneliness than heterosexual participants who used SNS for the same reason. This study adds to the growing literature on how older adults, and LGB older adults in particular, use SNS.

The use of the Internet and online social networking sites among older adults has seen substantial growth in recent years. Social networking sites (SNS), such as Facebook, Instagram, and LinkedIn, provide an opportunity to communicate and share information between users worldwide. According to Statistics Canada (2021), approximately six out of ten Canadians ages 50–64 and one in three Canadians over the age of 65 use social media regularly. Older adults report using SNS for a variety of reasons, including connecting with friends, keeping in touch with family, and making new friends (Chew et al., 2023; Newman et al., 2021) (see Table 4).

SNS can facilitate social connection by improving older adults' communication with family and friends and providing a space for sup-

Limited research has explored the relationship between SNS use and mental health in older adults. While some research has found inconsistent links between SNS use and mental health among older adults (Newman et al., 2021; Wiwatkunupakarn et al., 2022), other research demonstrates the benefits of older adults' SNS use on their mental health. For example, a scoping review of older adults' SNS use and mental health found that engaging with SNS was associated with better subjective well-being and fewer symptoms of depression (Chen et al., 2022). A study of middle-aged and older adults in Germany found that those who connected online daily with friends and family reported decreased loneliness and fewer symptoms of depression in comparison to less frequent users (Hajek & König, 2022). Qu et al. (2022) found that

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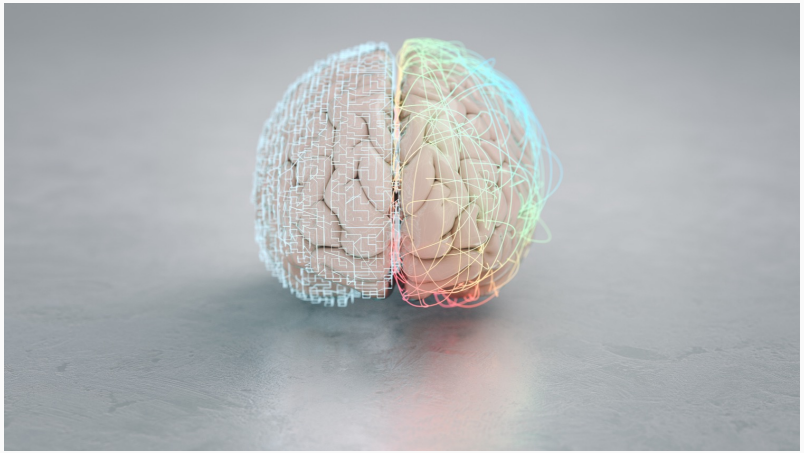

Cognition and Social Determinants

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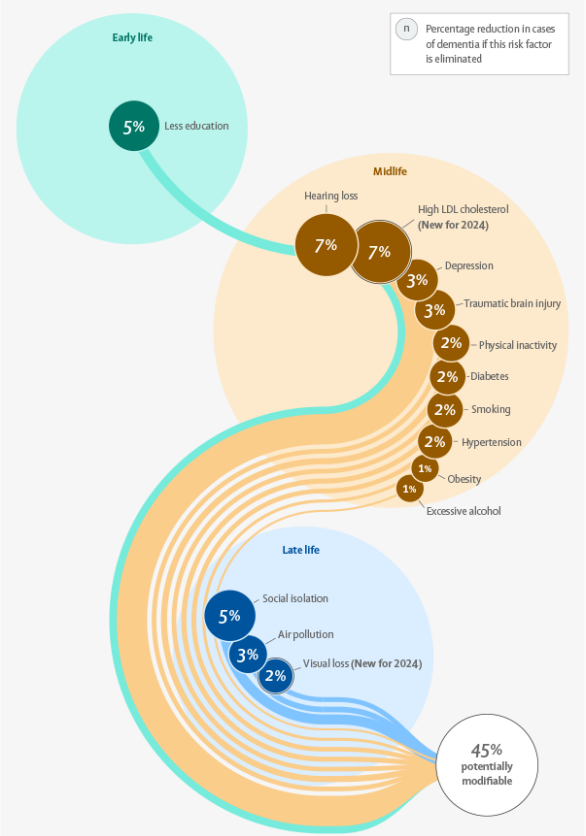
Cognitive Impairment and LGB People

- International evidence suggests that, in comparison to heterosexual peers, **older LGB adults:**
  - Display **higher prevalence** and **greater odds** of developing **cognitive impairment** (Hsieh et al., 2021; Liu et al., 2021)
  - Are more likely to report **subjective cognitive decline** (Flatt et al., 2021)
  - Have higher odds of reporting **concentration complaints** (Jacob et al., 2021)

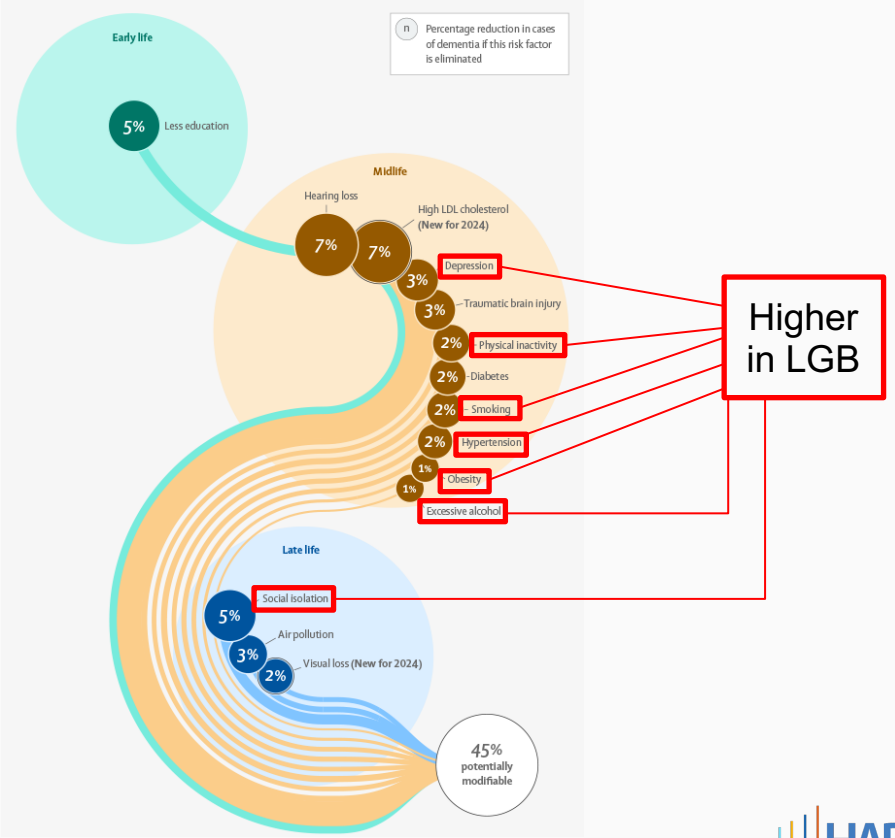
Modifiable Risk Factors for Dementia

(Livingston et al., 2024)



Modifiable Risk Factors for Dementia

(Livingston et al., 2024)



Modifiable risk factors
cluster around inequalities

Why?

- Minority Stress
  - **Chronic stress** due to **stigma and discrimination** accumulates over the **lifespan** and contributes to health and behavioural **inequalities**
  - This is exacerbated by **intersecting identities** (e.g., gender, race, socioeconomic status)

(Meyer, 2003)

Assessing Cognitive Risk using Risk Score Calculations

Utility of Cognitive Risk Scores

- For health professionals, cognitive risk scores **quantify** these modifiable risk factors, so we can **intervene early**

- For members of the public, risk scores are a **simple** and **tangible** way to see how **lifestyle changes** could lead to **lowered cognitive health risk** in the future

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Australian National University - Alzheimer's Disease Risk Index (ANU-ADRI)

(Anstey et al., 2014)

ANU-ADRI Component	Points Assigned
Age and Sex	65–70: +1 (M); +5 (F) 71–75: +12 (M); +14 (F) 76–80: +18 (M); +21 (F) 81–85: +26 (M); +29 (F)
Education	Grade 9-10: +3 <Grade 8: +6
Diabetes	+3
TBI	+4
Depression	+2
Smoking	+4 (current), +1 (past)

(Anstey et al., 2014)

ANU-ADRI Component	Points Assigned
Low Social Engagement	+1, +4, +6 (lowest engagement)
Fish Intake	<0.25 fish portions/week: 0 0.25–2 fish portions/week: −3 2–4 fish portions/week: −4 >4 fish portions/week: -5
Alcohol in Moderation	-3
Cognitive Activity	-6 (moderate), -7 (high)
Physical Activity	-2 (moderate), -3 (high)

(Anstey et al., 2014)

ANU-ADRI and Cognitive Decline

- **ANU-ADRI** is an effective tool for **identifying** those at risk of developing **dementia** (Anstey et al., 2014)
- **Higher ANU-ADRI** scores were significantly related to **worse cognition** at baseline and over a 2-year period (Hall et al., 2024)
- **Higher ANU-ADRI** were associated with **increased likelihood** of progressing from normal cognition to **Mild Cognitive Impairment** over a 12-year period (Andrews et al., 2017)

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Purpose

1) **Calculate cognitive risk scores** using the ANU-ADRI and **compare by sexual orientation**
2) Examine relationship between **ANU-ADRI** and objective measure of **cognition**
3) Explore how **additional social determinants** and risk factors may contribute to cognition

Data Source

- CLSA baseline data (2011-2015) from the Comprehensive cohort, ages 55+
- Complete data for n=16,516 (309 LGB; 16,207 heterosexual) participants
- ANU-ADRI components except pesticide exposure were mapped onto CLSA variables

Measures

- **Sexual Orientation**
  - Participants were asked: “Do you consider yourself to be: Heterosexual? Homosexual? Bisexual?”
- **Objective cognition** was measured using a CLSA-derived composite of 6 tests: (O’Connell et al., 2022)
  - RAVLT immediate
  - RAVLT delayed
  - Animal Fluency
  - Letter Fluency
  - Mental Alternation Test
  - Stroop Test – Victoria Version

Initial Analysis

- **Calculate** ANU-ADRI scores
- **Examine differences** between heterosexual and LGB groups on ANU-ADRI components using t-tests and Chi-square tests

Main Analyses

Series of linear regressions:

- 1) **Simple** linear regression with ANU-ADRI as the predictor and cognition as the outcome
- 2) **Adding sexual orientation** to the model
- 3) **Adding social determinants** (race, income)
- 4) **Adding risk factors** (hearing loss, vision loss, hypertension)

Results: ANU-ADRI Components by Sexuality

- In comparison to heterosexual participants, **LGB participants:**
  - Were **younger** ($t=7.53$ $p<.001$)
  - Were more likely to have history of **depression** ($\chi^2=24.12$, $p<.001$)
  - Were more likely to be former or current **smokers** ($\chi^2=19.02$, $p<.001$)
  - Had **lower social engagement** ($\chi^2=49.51$, $p<.001$)
  - Had a different pattern of **fish** intake ($\chi^2=17.35$, $p=.001$)

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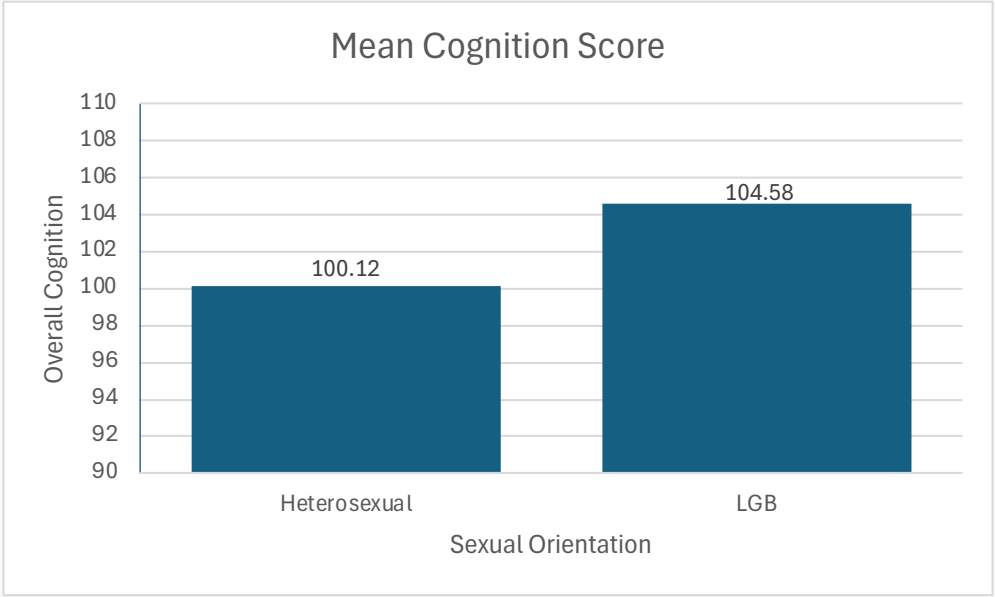
Results: ANU-ADRI Total Score by Sexuality

- In comparison to heterosexual participants, **LGB participants** displayed **lower risk scores** on average (t=-3.32, p=.001)

- LGB: M=-1.08 (SD=8.85; range -16 to 30)
- Heterosexual: M=0.61 (SD=10.62; range -18 to 39)

Possible ANU-ADRI Total Score Range: -18 to 54

Results: Cognition



t=5.27, p<.001

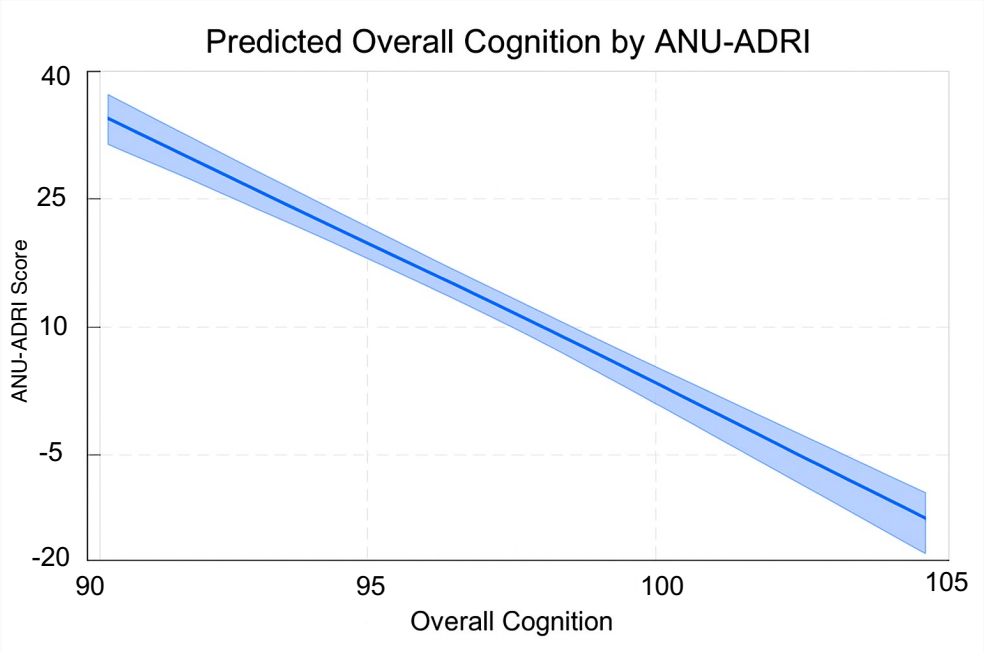
LGB:
M=104.58
SD=14.72;
Range 65.07 to 149.85

Heterosexual:
M=100.12
SD=15.05
Range 36.60 to 169.19

LGB participants had

higher overall cognition scores on average

Results: Simple Linear Regression



B=-0.23, p<.001

In the overall sample,
higher ANU-ADRI was associated with **lower cognition** scores

Results: Adding Sexual Orientation to the Model

Outcome: objective cognition

Covariates: ANU-ADRI, sexual orientation

- The model was statistically significant $F(2, 16513)=242.12$, $p<.001$, $R2=.03$
- **LGB participants** had significantly **higher cognition scores** in comparison to heterosexual participants **even after controlling for ANU-ADRI score** ($B=4.06$, $p<.001$)

Results: Adding Social Determinants to the Model

Outcome: objective cognition

Covariates: ANU-ADRI, LGB, race, income

- The model was statistically significant $F(7, 15419)=116.80$, $p<.001$, $R^2=.05$
- **All social determinants** were significant predictors of cognition
- After controlling for race and income, **sexual orientation remained a significant predictor of cognition** ($B=4.26$, $p<.001$)

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Results: Adding Risk Factors to the Model

Outcome: objective cognition

Covariates: ANU-ADRI, LGB, race, income, hypertension, hearing loss, vision loss

- The model was statistically significant $F(10, 15351)=84.96$, $p<.001$, $R^2=.05$
- **Hypertension** and **hearing loss** were both significantly **associated with lower cognition**; vision loss was not
- **Social determinants remained significant predictors** after controlling for these additional risk factors

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Key Takeaways

- ANU-ADRI points assigned for **age, depression, smoking, social support, and fish consumption** differed by sexual orientation
- **Higher ANU-ADRI** scores were associated with **lower cognition** in the overall sample
- **Social determinants**, including sexual orientation, race, and income, may be **important considerations when assessing cognitive risk**

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Future Research

- Updating cognitive risk scores to **include newly identified risk factors** (e.g., hearing loss)
- Exploring **longitudinal trajectories** of older LGBTQIA+ adults' cognitive risk and objective cognition
- Examining cognitive risk in **trans, intersex, and non-binary** people