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PhD dissertation

"Health inequalities among university students: The association between social capital, sense of belonging and psychological health"

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"Of all the domains in which I have traced the consequences of social capital, in none is the importance of social connectedness so well established as in the case of health and well-being"
Putnam, 2000, p.326

Dedicated to all those young people battling mental illness.

Declaration

I hereby declare that the work presented in this thesis has not been submitted for any other degree or professional qualification, and that it is the result of my own independent work. Results presented have partly been and may be further published in peer reviewed scientific journals.

Insa Backhaus

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31.01.2020

Date

Summary

Background

A mental health crisis has hit university campuses across the world. According to a survey conducted by the World Health Organization approximately one-third of first-year students suffer for a common DSM–IV mood (e.g., major depressive disorder), anxiety, or substance disorder. The study also showed significant country variations, with the highest rates of mental health problems found among students from Australia. Furthermore, in recent years, there has been growing concern about the poor mental health of young people of gay, lesbian, bisexual, or questioning/queer (LGBQ) sexual orientation. Apart from individual characteristics (e.g., genetic predisposition for depression), studies have documented the role of social determinants (e.g., socioeconomic status) on the etiology and evolution of mental disorders. A number of studies suggest that social capital, often referred to as features of social structures including interpersonal trust and mutual support, is an important determinant of health. Although there is evidence of an association between social capital and many indicators of health most research to date has been conducted among adult and adolescent samples and has primarily focused on one geographical area. Evidence on the effect of social capital on young adults' and students' health, specifically, remains limited. However, to tackle the ongoing student mental health crisis it is important to look beyond the common social determinants of health.

The here presented thesis comprises three parts:

- Part I: The SPLASH study
- Part II: The HMS study
- Part III: Overall conclusion

Key aims

Part I: To facilitate a cross-national comparison of the prevalence of mental health problems and to investigate whether social capital is associated with such problems in university students in 12 countries.

Part II: To explore differences in mental health problems between LGBQ and heterosexual students, with a specific focus on the moderating effects of sexual assault and sense of belonging. The specific objective of the secondary data analysis is to test for a potential three-way interaction effect (i.e., moderated moderation) between sexual assault, sense of belonging, and sexual orientation. Specifically, the study aims to examine a) whether there is a difference in mental health between LGBQ and heterosexual students, b) whether exposure to sexual assault may affect students' psychological states, such as depressive symptoms and suicidality, c) whether a high sense of belonging can buffer the effects of sexual assault exposure on psychological states, and d) whether this differs according to sexual orientation.

Data used

Several methodological approaches were applied due to the diverse range of aspects studied.

Part I: To assess whether there is an association between social capital and students' health, the Social Capital and Students' Health study (SPLASH) was developed. This is a two-wave panel study conducted among students from different faculties during their first year at university in Europe, Asia, the Western Pacific, and Latin and North America.

Data was obtained through a self-administered questionnaire, including questions on sociodemographic characteristics, depressive symptoms, suicidal ideation, health behaviors and social capital.

Part II: Because not enough data for LGBQ students was available (sample size = 7 students), a secondary data analysis was performed using variables from the 2017-2018 Healthy Minds Study (HMS) dataset. HMS is an annual cross-sectional web-based survey that examines mental health, service utilization, and related factors among undergraduate and graduate students in the United States.

Statistical analyses

Part I: Multilevel logistic regression modelling was used to analyze hierarchical data with individuals (1st level) nested in universities/countries (2nd level). The analyses were adjusted

for sociodemographic characteristics, covariates (e.g., perceived stress), and country-level characteristics (e.g., country income).

Part II: To test for a possible three-way interaction effect, Hayes PROCESS macro models were used in SPSS.

Results

Part I: A total of 4,228 students participated in the SPLASH study. Forty-eight percent presented clinically relevant depressive symptoms. The likelihood of having clinically depressive symptoms was greater among those with low individual levels of cognitive social capital (OR: 1.82, 95% CI: 1.44 – 2.29) and those living in regions with low levels of social capital and political instability (OR: 3.22, 95% CI: 1.21 – 8.58).

Part II: In the HMS, 60,200 students from 60 campuses in the United States participated. Around 20% (circa 12,000 students) identified as LGBQ. A significantly higher proportion of LGBQ students reported depression, suicidal ideation, and sexual assault compared to heterosexual students. A significant three-way interaction effect was found for sexual orientation, sexual assault, and sense of belonging, predicting depressive symptoms (b= -0.06, p=0.042) and suicidality (b= -0.10, p=0.004). The effect of sexual assault on mental health differed depending on sexual orientation and sense of belonging. In particular, among LGBQ students, a high sense of belonging was protective in the presence of sexual assault, while its absence had a deleterious effect on mental health.

Discussion:

Part I and Part II: Both the SPLASH study and the HMS study offered a new data on possible risk and protective factors for depressive symptomology among university students. However, both studies followed a cross-sectional design, and therefore, inferences about causality and the directionality of the variables cannot be made. It is possible that social capital and sense of belonging influence students' mental health or vice versa.

Conclusions

Part I: The SPLASH study shows that social capital has a positive effect on the self-rated and psychological health of university students. To understand the decrease in students' psychological health, one must also consider social aspects of their environment, such as social capital. Strengthening social capital should be considered an important health promotion strategy. Tackling mental health issues among university students requires joint action from universities, mental health professionals, policymakers, and political leaders.

Part II: The secondary data analysis of the HMS study illuminates an important step in understanding mental health disparities in LGBQ students. The findings highlight the need to reduce mental health problems and sexual assault on college campuses, and to foster a sense of belonging to the college. Further longitudinal studies may continue to examine stressors and protective factors that account for mental health disparities among LGBQ and heterosexual students.

A modified version of the second part of this thesis has been published in the Journal of American College health (Backhaus et al. 2019).

Sommario

Introduzione

L'idea di questo progetto nasce da una ricerca iniziata durante il primo anno del mio dottorato, in cui ho studiato lo stato di salute degli studenti in Italia. Lo studio ha dimostrato che gli studenti universitari italiani hanno una bassa qualità della vita salute-correlata, con punteggi particolarmente bassi per quanto riguarda la componente della salute mentale (MCS, da Mental Composite Score), ricavata dall'utilizzo del questionario SF12. Con un punteggio di MCS12 di soli 41.3 (DS = 10.0), gli studenti hanno ottenuto punteggi molto al di sotto di 49.1, valore di riferimento medio relativo alla popolazione generale italiana. La depressione giovanile è un fenomeno in crescita e la scarsa salute mentale degli studenti rappresenta un'emergenza non solo in Italia, ma anche in altri Paesi del mondo. Secondo l'OMS la percentuale dei disturbi mentali nei giovani è destinata ad aumentare fino al 20% nel 2020. Il suicidio rappresenta, a livello mondiale, la seconda causa di morte nei giovani fra i 15 e i 29 anni, preceduto solo dagli incidenti stradali. I problemi di salute mentale e degli stili di vita sono comuni tra gli studenti, ma spesso sottovalutati. Inoltre, tra i vari gruppi di studenti esistono grandi differenze relativamente alla loro salute. Per esempio, il rischio di patologia mentale, come la depressione, è 3 volte più alto nella popolazione LGBTQ (lesbiche, gay, bisessuali, transgender, queer/questioning). Un nuovo studio ha evidenziato che il 6% degli individui appartenenti alla comunità LGBT, ha tentato il suicidio nell'ultimo anno.

La salute mentale degli studenti, ed in particolare di quelli appartenenti alla comunità LGBTQ, rappresenta un notevole problema di sanità pubblica. Per affrontare questa emergenza è importante conoscere e studiare i fattori che potrebbero influenzare la salute e che contribuiscono alle disuguaglianze sanitarie. Recentemente, è stato suggerito che tra i determinanti socioeconomici è da prendere in seria considerazione il capitale sociale. Attualmente, la definizione di capitale sociale non è univocamente riconosciuta essendo numerose le definizioni proposte. Tuttavia, in generale il capitale sociale definisce la presenza di comportamenti cooperativi e collaborativi tra gli individui. Si ritiene che esso eserciti un ruolo significativo sul benessere, sulla salute mentale e sulle scelte relative agli stili di vita. Numerose ricerche scientifiche supportano l'ipotesi che individui con un livello più alto di

capitale sociale mostrino una migliore salute mentale rispetto agli individui con un livello inferiore. Fino ad ora, poca attenzione è stata dedicata all'associazione tra capitale sociale e salute negli studenti universitari, ma esso risulta indubbiamente preponderante tra i fattori potenzialmente implicati nel determinare disuguaglianze sanitarie.

Struttura della tesi

Questa tesi di dottorato contribuisce alla comprensione della problematica della cattiva salute tra gli studenti universitari. La tesi è stata in tre parti.

- Prima parte: SPLASH study
- Seconda parte: HMS study
- Terza parte: Conclusioni

Tuttavia, la tesi è composta da articoli di ricerca (p. xxii: titoli degli articoli). Successivamente gli articoli sono stati inviati per la pubblicazione su riviste accademiche. La tesi è scritta in inglese.

La Prima Parte

La prima parte, articolata in sette capitoli è il contributo principale a questa tesi: viene presentato lo studio SPLASH che ho sviluppato nel corso del mio dottorato. Nel primo capitolo viene fornita un'introduzione della tesi (cfr. chapter 1). Nel secondo capitolo (cfr. chapter 2) vengono descritte le varie definizioni di capitale sociale esistenti ed il 'theoretical background'. Nel terzo capitolo vengono spiegate l'importanza di studiare la salute degli studenti, e le differenze nella salute tra gli studenti e la popolazione in generale. Gli obiettivi dello studio sono mostrati nel capitolo 4. In seguito, è presentata la metodologia usata per analizzare i dati (capitolo 5). Nel sesto capitolo vengono infine presentati i risultati dello studio internazionale. L'ultimo capitolo della prima parte affronta i limiti metodologici, nonché le implicazioni pratiche per la promozione della salute tra gli studenti. Infine, vengono anche discussi dei suggerimenti per ulteriori ricerche che includano un approfondimento dei meccanismi alla base di questa tesi/ di queste correlazioni.

Obiettivo principale:

L'obiettivo principale della ricerca è stato di analizzare la salute mentale e di verificare l'esistenza di un'associazione tra capitale sociale, sintomi depressivi e scorretti stili di vita (quali fumo, alcol ed inattività fisica) negli studenti universitari di dodici Paesi.

Metodi/ Dati usati:

Per raggiungere l'obiettivo della prima parte è stato condotto uno studio trasversale, lo SPLASH studio, tra gli studenti iscritti al primo anno universitario di diverse facoltà in Europa, Asia, Oceania e America Latina e del Nord. Ad un campione di 4,228 studenti è stata somministrata una batteria di questionari volti ad indagare: le variabili sociodemografiche, la sintomatologia depressiva, la qualità della vita, lo stress percepito e il capitale sociale. Per misurare la sintomatologia depressiva è stato utilizzato il questionario di Beck semplificato (Beck Depression Inventory-S). Il capitale sociale è stato valutato utilizzando il questionario della World Bank.

Analisi statistiche:

Per analizzare i dati è stato effettuato il calcolo delle statistiche descrittive di posizione e di dispersione per le variabili sociodemografiche, la sintomatologia depressiva, qualità della vita salute-correlata, stress percepito e capitale sociale. Per valutare l'associazione fra la sintomatologia depressiva e capitale sociale sono state condotte analisi multilivello volte ad analizzare l'associazione tra capitale sociale e sintomi depressivi, adattando le singole co-variate (ad esempio, lo stress percepito) e le caratteristiche del paese di provenienza (ad esempio, il reddito del paese). Inoltre, la consistenza interna dei questionari è stata valutata con il coefficiente alfa di Cronbach.

Resultati:

Nello SPLASH studio hanno partecipato circa 4,230 studenti. Il 68.9% dei partecipanti è risultato di sesso femminile con età media di 20.36 anni (DS = 2.17). Nel nostro campione, uno stato depressivo clinicamente significativo si è riscontrato complessivamente nel 48% del campione (punteggio di BDI-S≥35). Sono state osservate ampie variazioni nei sintomi depressivi tra i vari Paesi, con livelli più bassi nei Paesi europei, livelli intermedi nei Paesi

dell'Asia Pacifico e livelli più elevati nei campioni del Sud America. L'analisi di regressione multilivello, dopo aggiustamento per tutte le variabili sociali rilevanti, ha evidenziato un'associazione significativa tra il capitale sociale 'cognitivo' e depressivo clinicamente significativo (OR: 1.82, IC al 95%: 1.44 – 2.29), e tra il capitale sociale 'comportamentale' (OR: 1.51, IC al 95%: 1.29 – 1.76) e depressivo clinicamente significativo. Inoltre, i nostri dati mostrano che gli studenti provenienti da Paesi con economia a reddito medio-alto (ad es. Albania, Brasile, Malesia) avevano maggiore probabilità di riportare sintomi depressivi clinicamente rilevanti (OR: 3.12, IC al 95%: 1.07 – 9.11).

Discussione:

Con lo studio trasversale SPLASH è impossibile stabilire il nesso temporale tra un determinante e un effetto. Quindi, con il presente disegno dello studio non siamo in grado di capire se è il capitale sociale che influenza la salute mentale o viceversa. È probabile che la relazione tra capitale sociale e salute sia circolare. In particolare, da un lato, una rete di relazioni sociali vasta e fitta contribuisce a mantenere elevato il livello di benessere della persona, dall'altro, la buona salute è una condizione necessaria per prendere parte alla vita sociale. Però, i risultati mostrano che il capitale sociale – definito come l'aspettativa individuale circa la propensione degli altri ad assumere un comportamento cooperativo - ha un effetto positivo sulla salute degli studenti universitari.

Conclusione:

Parte I: Per riassumere, lo SPLASH studio mostra che lo stato depressivo clinicamente significativo è altamente prevalente nel nostro campione di studenti universitari. In relazione all'associazione tra stato depressivo clinicamente significativo e capitale sociale, lo studio ha identificato che livelli inferiori di capitale sociale sono dannosi per la salute mentale. I risultati suggeriscono che il miglioramento del capitale sociale a livello micro e del capitale sociale a livello macro può aiutare a ridurre e prevenire le disparità sanitarie tra le università. Lo studio di natura trasversale non può stabilire con certezza che il capitale sociale possa promuovere in modo duraturo la salute mentale oppure che le persone mentalmente sane siano semplicemente più socialmente attive o se siano i fattori contestuali ad influenzare il capitale sociale e la salute. Tuttavia, i risultati che riportiamo qui sono sufficientemente forti da

giustificare un potenziamento della ricerca volta ad esplorare possibili meccanismi che collegano il capitale sociale e la salute mentale. Le università, ad esempio, dovrebbero prendere in considerazione la promozione di attività sociali e sportive. Inoltre, dovrebbero scoraggiare l'uso del telefono durante le pause e il tempo libero, favorendo invece conversazioni con amici e colleghi di corso.

La seconda parte

La seconda parte è stata pubblicata sulla rivista "Journal of American College Health" e risulta articolata in sei capitoli. È un'analisi dei dati secondaria e si focalizza sulla salute mentale di lesbiche, gay, bisessuali e 'queer/questioning' (LGBQ). In particolare, si concentra sull'abuso sessuale e sul possibile effetto mitigante del senso di appartenenza all'università. In particolare, gli studenti LGBQ dichiarano di aver subito discriminazioni a scuola o all'università in una percentuale maggiore rispetto agli eterosessuali, ed allo stesso tempo dimostrano un più scarso senso di appartenenza. Quest'ultimo è stato definito come un sentimento di inclusione e percezione del proprio valore personale in un contesto (ad es. senso di appartenenza all'università). È opportuno comunque specificare che allo stato attuale il senso di appartenenza viene inquadrato come una variabile intermedia nella definizione del capitale sociale. Questo perché l'appartenenza ad un gruppo sociale potrebbe creare dei benefici per i membri e permettere così lo sviluppo di un senso di solidarietà che permette alla rete o al gruppo stesso di esistere.

Il Capitolo 1 della seconda parte offre una introduzione generale e il senso di appartenenza come una variabile intermedia di capitale sociale. Il Capitolo 2 presenta una descrizione panoramica riguardo la salute mentale degli studenti LGBQ, introducendo l'importanza del senso di appartenenza ed il problema dell'abuso sessuale negli studenti LGBQ. Il Capitolo 3 presenta la metodologia statistica. Nel Capitolo 4 viene fornita una descrizione dei risultati e nel Capitolo 5 è invece contenuta la discussione ed un confronto critico dei risultati. Il Capitolo 6 presenta la conclusione della seconda parte.

Obiettivo principale:

L'obiettivo principale della seconda parte è stato di esaminare la prevalenza di problemi di salute mentale tra gli studenti lesbiche, gay, bisessuali e queer/questioning (LGBQ) e studenti eterosessuali. Si è voluto studiare il ruolo di alcuni fattori con potenziale "effetto mitigante" ("buffering effect") ed altri con possibile "effetto rafforzante" ("enhancing effect") aumentando il rischio di depressione e suicidio. Il senso di appartenenza all'università, ad esempio, avrebbe ripercussioni sul benessere tramite un "effetto mitigante" (quindi il senso di appartenenza, potrebbe fungere da mitigante). L'abuso sessuale (per abuso sessuale si intende il coinvolgimento in attività sessuali, fisiche o psicologiche, di una persona non in grado di scegliere o perché sottoposta a costrizione fisica e/o psicologica, e/o perché non consapevole delle proprie azioni), invece, potrebbe avere un effetto di rafforzante. Quindi, è stato anche investigato a) se l'abuso sessuale influenza gli stati psicologici degli studenti, come sintomi depressivi e pensieri di suicidio, b) se un alto senso di appartenenza all'università possa mitigare l'effetto che l'esposizione ad abusi sessuali ha sugli stati psicologici e c) se ciò differisce in base all'orientamento sessuale.

Metodi/ Dati usati:

Per valutare eventuali differenze e fattori rischi tra gli studenti LGBQ ed eterosessuali non erano a disposizione dati sufficienti dallo SPLASH studio. Pertanto, è stata condotta l'analisi di dati secondaria delle variabili del set di dati 2017-2018 Healthy Minds Study (HMS). Lo studio HMS è un sondaggio annuale tra gli studenti universitari statunitensi.

Analisi statistiche:

Per rilevare eventuali differenze e fattori di rischio tra gli studenti LGBQ ed eterosessuali è stata eseguita un'analisi bivariata calcolando il coefficiente di correlazione di Pearson per le variabili continue, ed inoltre è stato eseguito il t-test. Per verificare un possibile effetto di interazione a tre vie sono stati utilizzati i macro-modelli Hayes PROCESS in SPSS.

Risultati:

Nello HMS hanno partecipato circa 60,200 studenti da 60 università negli Stati Uniti. Il 20% (circa 12,000 studenti) si dichiara LGBQ. Gli studenti LGBQ riportano condizioni di salute

mentale più cagionevoli, rispetto ai coetanei eterosessuali in tutti gli item considerati ($p<0.001$). Per esempio, il pensiero di suicidio era più alto nella popolazione LGBQ (40%), rispetto a quella eterosessuale (18%). Inoltre, sono stati riscontrati significativi effetti di interazione a tre vie ('three-way interaction effects') per l'orientamento sessuale, abuso sessuale e il senso di appartenenza al college che predicono i sintomi depressivi ($b= -0.06$, $p=0.042$) e pensiero di suicidio ($b= -0.10$, $p=0.004$). L'effetto dell'abuso sessuale sulla salute mentale differiva a seconda dell'orientamento sessuale e del senso di appartenenza. In particolare, tra gli studenti LGBQ, l'alto senso di appartenenza al college era protettivo in presenza di abusi sessuali. L'assenza del senso di appartenenza invece aveva un effetto deleterio sulla salute mentale.

Discussione:

Come lo SPLASH studio, anche l'HMS era uno studio trasversale e risulta pertanto impossibile stabilire il nesso consequenziale tra determinante e effetto. Inoltre, è stato misurato il senso di appartenenza all'università, e non il senso di appartenenza al generale contesto sociale o alla comunità LGBQ.

Conclusione:

Relativamente ai risultati dello studio HMS il senso di appartenenza al college è sembrato fondamentale per la salute mentale tra gli studenti LGBQ, in particolare se questi avevano avuto esperienza di abuso sessuale. Sviluppare e implementare strategie per migliorare il senso di appartenenza è importante per mitigare la depressione e promuovere la prevenzione del suicidio, in particolare tra gli studenti LGBQ.

La terza parte

Nell'ultima parte (Parte III), viene fornito un sommario della tesi e la conclusione finale dei due studi presentati.

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Abbreviations

Abbreviation	Term
BDI-S	Simplified version of Beck Depression Inventory
CI	Confidence Interval
CPI	Corruption Perception Index
DS	Depressive Symptoms
FSI	Fragile States Index
GDP	Gross domestic product
GLB	Gay, lesbian, bisexual
GNI	Gross national income
HMS	Healthy Minds Study
HRQOL	Health-related quality of life
ICC	Interclass correlation coefficient
LGBQ	Lesbian, gay, bisexual, queer, questioning
M	Mean
MCS12	Mental component summary score
OR	Odds Ratio
PHQ-9	Patient Health Questionnaire 9
PS	Perceived Stress
PS	Perceived Stress Scale
r	Pearson correlation
SD	Standard deviation
SES	Socio-economic status
SPLASH	Social Capital and Students' Health
SPSS	Statistical Package for Social Science
STATA	Software for Statistics and Data Science
UK	United Kingdom
USA/US	United States
WHO	World Health Organization

Publications associated with this research

Published:

Full text:

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Conference abstract:

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Backhaus, I., Zaranza, L., Borges, C. M., & Ramirez-Varela, A. (n.d.). *Depressive symptoms among Brazilian college students during a political and economic crisis: A Brazilian population-based study.*

Introduction

"Learn from yesterday, live for today, hope for tomorrow. The important thing is not to stop questioning."

(Albert Einstein, n.d.)

Following this saying by Albert Einstein, I decided to continue my research on university students' health after obtaining alarming results from a study I conducted during my first six months as a PhD student. Using data from an Italian multi-center cross-sectional study, I found that Italian university students scored poorly on health-related quality of life (HRQOL), with particularly low scores on the mental health component summary score (MCS12) (Backhaus et al., 2019). Moreover, students' MCS12 score was almost 8 points lower than that of the Italian general adult Italian population (Istituto nazionale di statistica, 2016).

I quickly came to realize that this phenomenon is not restricted to Italy alone. Rather, over the last years, a crisis has swathed over university campuses across the world. In the United States (US) and the United Kingdom (UK), in particular, decreasing mental health has been reported among university students and has consequently moved into the focus of the public eye (Lipson, Lattie, et al., 2019). While we tend to think of university students as being a cosseted and privileged group in society due to their age and social standing, more and more facts suggest that they are in fact worse off.

To date, most research exploring students' health has focused primarily on individual-level characteristics as risk factors for poor health. These risk factors include, among others, sexual orientation, lower socioeconomic status, hazardous alcohol consumption, smoking, and physical inactivity (Bandiera et al., 2016; Clemente et al., 2016; Ibrahim, Kelly, & Glazebrook, 2013; Klemenc-Ketis et al., 2011; Ngin et al., 2018; Pedrelli et al., 2011). However, the transition from an adolescent-in-family to an independent university student involves many contextual as well as individual changes (Vaez et al., 2010). Many students explore new interests and search for new social networks as well as innovative social norms (Vaez et al., 2010).

Furthermore, the results of my study on HRQOL suggested a north–south divide in students' mental health: students from the south of Italy had significantly lower mental health scores than students from cities located in central Italy (Backhaus et al., 2019). Similar findings were detected by Auerbach and colleagues (2018) who found great country variations in prevalence of mental health issues with highest rates among students from Australia. For my study conducted in Italy, it is likely that certain social and contextual factors, such as the economic situation in Southern Italian regions are behind this.

Social networks, and social capital in particular (commonly referring to the resources derived from one's membership in social networks), have been proposed to be health protective. A lack of social capital, in contrast, is thought to be health damaging (Borges et al., 2010; Fujiwara & Kawachi, 2008; Novak et al., 2017). However, most studies on the association between social capital and health have been conducted among adolescents, adults, and the elderly, leaving the association between social capital and students' health underexplored.

Following the results of my study on HRQOL and recent reports on students' decreasing mental health, I developed the SPLASH study. The SPLASH study aims to provide a cross-national comparison of student's health and to detect whether there is an association between social capital and students' health. To date, data has been collected from more than 4,200 university students from 12 countries: Albania, Australia, Brazil, Germany, Italy, Kosovo, Oman, South Korea, Taiwan, and the USA.

Another widely discussed risk factor for depression among university students is sexual orientation (Cochran et al., 2003; Oswalt & Wyatt, 2011). Several studies have shown that the prevalence of mental health problems is significantly higher among those with a sexual orientation other than heterosexual (Cochran et al., 2003; Oswalt & Wyatt, 2011). Because the SPLASH study did not provide a large enough sample of students identifying as something other than heterosexual (n = 7), it was not possible to analyze differences between students identifying as lesbian, gay, bisexual, or queer/questioning (LGBQ) and students with a heterosexual orientation. Therefore, I performed a secondary data analysis using variables

from the 2017-2018 HMS dataset. Briefly, the HMS is an annual web-based survey study examining mental health among university students across universities in the US.

1.1 Thesis structure

The information and data provided come from individual research papers that have been submitted for publication or have been published in academic journals (please see page xxii for publications resulting from this study). This thesis is structured using a book format and comprises three parts:

- Part I: The SPLASH study
- Part II: The HMS study
- Part III: Overall conclusion

The first and most important part, in terms of effort and time spent, is devoted to the SPLASH study, which is the main component of my PhD research. This part begins with a brief introduction on the health status of university students (Chapter 1). Chapter 2 presents theoretical perspective and provides the various definitions for concepts and terms used in this thesis, including mental health, the social determinants of health and social capital. It also provides the theoretical framework for this study. The significance of the research (Chapter 3) is then discussed and a brief review of the scientific literature on health disparities among university students is provided, followed by the formal aim and hypotheses (Chapter 4). Next, Chapter 5 outlines the methodology and applied statistical tests. The results are presented in Chapter 6. Since the primary subject of this study is students' mental health, the Chapter begins with the results concerning depressive symptoms and suicidal ideation, followed by analyses on self-rated health. Chapter 7 interprets and discusses the results. Finally, it addresses methodological limitations and notes practical implications for research, health promotion, and policy.

Part II of the thesis examines another important public health issue: health disparities between college students identifying as heterosexual and those LGBQ. It presents the findings of the secondary data analysis using HMS data. Specific attention is placed on sexual assault and sense of belonging as possible moderating factors. The second part starts by introducing sense

of belonging as a potential characteristic and intermediate variable of social capital (Chapter 1). The literature is then reviewed, and the specific aims are presented (Chapter 2). Chapter 3 outlines the methods employed and the theoretical framework. Then, Chapter 4 provides the results, while Chapter 5 discusses and synthesizes the information presented. The last chapter (Chapter 6) of the second part concludes the study.

Part III comprises the overall concluding chapter. It provides a summary of key findings of the SPLASH study and the secondary data analysis of the HMS study, along with their main implications. The thesis finishes with a personal reflection.

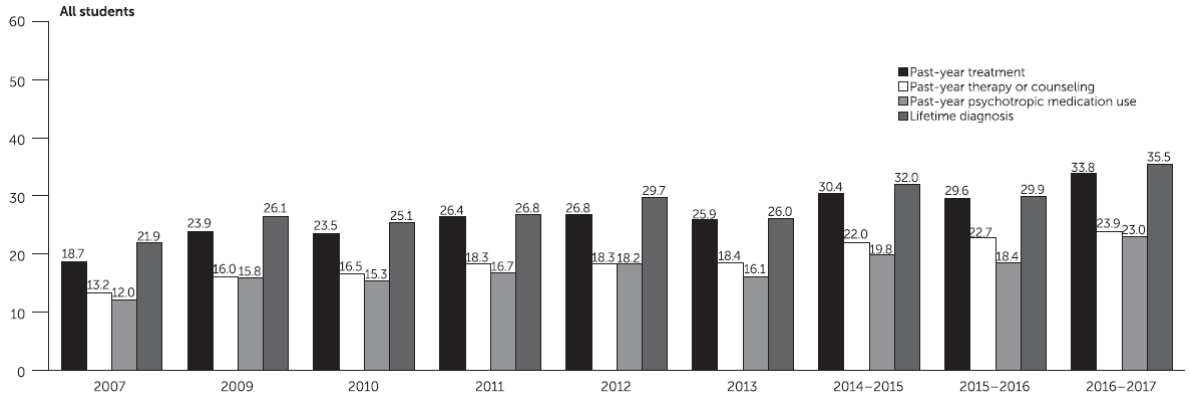
PART I

The SPLASH study

Chapter 1: Background

The mental health of university students has become a critical concern of numerous universities across the world. Many counselling centers have reported sharp increases in the number of students wanting treatment for mental health issues. While in the 1980s, perhaps one in ten college students could be characterized as needing, wanting, or using some form of mental health treatment, today that number is one in three (Henriques, 2018). Lipson, Lattie, and Eisenberg (2019) found that in the US, the proportion of students who screened positive for depression and suicidal ideation increased every year from 2007 to 2017. In particular, their analysis showed that the percentage of students with a diagnosed mental health condition, such as depression, increased from 21.9% in 2007 to 35.5% in 2016–2017 (Figure 1). The authors also detected an increase in the rates of students obtaining treatment in the past year, rising from 18.7% in 2007 to 33.8% in 2017 (Figure 1).

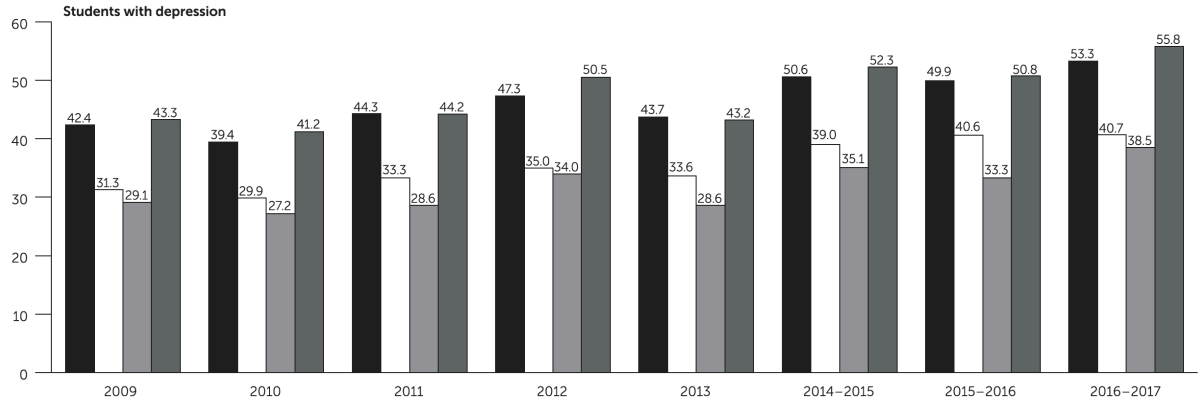
Figure 1. Mental health service utilization, in percentages, by the full population of college students, by year[a]



[a]*Source: Lipson, Lattie and Eisenberg (2019), Healthy Minds Study (full population, N=155,026 students at 196 campuses; students with depression, N=41,299 students at 183 campuses). Depression is defined as a score of ≥3 on the adapted Patient Health Questionnaire–2 (PHQ-2); PHQ-2 data were unavailable for the researchers.*

The number of students diagnosed with depression who were seeking help also significantly increased, with rates of nearly 50% or more for both treatment and diagnosis after 2013 (Figure 2). Unfortunately, a similar pattern was found for suicidal ideation. The research team reported a five-percentage point increase in the latter from 2007 to 2016-2017: while in 2007, 5.8% reported having suicidal thoughts, this number rose to 10.8% in 2016-2017.

Figure 2. Mental health service utilization, in percentages, by the full population of college students with depression, by year[b]



[b]*Source: Lipson, Lattie and Eisenberg (2019), Healthy Minds Study (full population, N=155,026 students at 196 campuses; students with depression, N=41,299 students at 183 campuses). Depression is defined as a score of ≥3 on the adapted Patient Health Questionnaire–2 (PHQ-2); PHQ-2 data were unavailable for the researchers.*

1.1 Possible factors impacting students' health

There are numerous reasons why young adults attending college may experience a decrease in their health. First, the transitioning time from adolescence to young adults, also referred to as emerging adulthood, is accompanied by particular stressors (Arnett, 2000). For the first time in their lives, many young students move away from home and experience separation from social support systems, including family members and friends. Second, attending a university often comes with increased personal independence and with a move away from parental rules and restrictions (Vaez et al., 2010). It is not uncommon for students to pick up health risk behaviors, such as excessive alcohol consumption (Vaez et al., 2010). In addition, students may face financial concerns and academic responsibilities and pressure (Crocker & Luhtanen, 2003; Richardson et al., 2017). Often, first-year university students feel "ill prepared" for the transition from high school to university, and they face academic expectations that are greater than what they have so far experienced (Brinkworth et al., 2009).

In an investigation of first-year college students in the US, Egan and colleagues (2017) found that two-fifths of subjects reported feeling overwhelmed (Quote by a student: "I felt overwhelmed by all I had to do").

While the above factors may negatively influence the adjustment to university and students' health, the following factors are believed to positively influence students' adjustment and health: positive coping and social support (Wang et al., 2018). Coping, which is the ability to deal successfully with a difficult situation, can have a direct effect on an individual's physical and emotional health. A longitudinal study demonstrated that using numerous positive coping strategy simultaneously led to less suicidal ideation over time (Heffer & Willoughby, 2017). Other studies have reported similar results. Hall, Peden, Rayens, and Beebe (2004) found that as an individual's perceived support by family and friends increases, the incidence of depressive symptoms decreases. Likewise, Alsubaie, Webster, and Wadman (2019) revealed that social support from family and friends is a predictor of depressive symptoms: in their study, students with no depression scored significantly higher on the Multidimensional Scale of Perceived Social Support (Alsubaie et al., 2019). However, a student's decision to seek support may depend on his or her interpersonal trust in the person or social network providing the support (Mortenson, 2009). Mortenson (2009), for instance, has suggested that interpersonal trust is associated with appropriate help seeking, which in turn predicts the likelihood of showing emotional distress.

Chapter 2: Definitions and theoretical framework

2.1 Introduction

The first part of this chapter briefly reviews the various definitions, conceptual framework of (social) determinants of health and social capital, followed by a review of studies concerning social capital and health. The last part of the chapter presents a theoretical model demonstrating possible pathways between social capital, depressive symptoms, suicidal ideation, and self-rated health.

2.2 Psychological health

Psychological health or mental health is a complex construct. One of the most often used definition comes from the World Health Organization (WHO) (2019) which defines mental health as "…a state in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community."

2.2.1 Depression and suicidal ideation

Depression is defined by the WHO (WHO, 2019a) as "…a common mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness and poor concentration". Symptoms of depression can be complex, they can vary one person to another, from mild to severe and maybe long lasting or recurrent. Persons who suffer from the depression may feel hopeless and sad and may have lost interest in things they used to enjoy (WHO, 2019a; World Health Organization, 2017). Psychological symptoms of depression can include the following:

- Feeling sad
- Loss of interest in activities once enjoyed
- Trouble sleeping or sleeping too much
- Increased fatigue or loss of energy
- Feeling worthless or guilty
- Difficulty concentrating

- Difficulty in making decisions
- Suicidal thoughts (Thoughts of one owns death or suicide)

Suicidal ideation, also known as suicidal thought or suicidality, is defined as a person's thoughts of serving as "the agent" of one's own death and can vary in its seriousness (American Psychiatric Association, 2006).

2.3 Health inequalities

The WHO (2019b) defines health inequalities as "…differences in health status or in the distribution of health determinants between different populations groups". Examples for health inequalities include differences in mortality rates between people from different social classes. Whilst some health inequalities are attributable to biological factors (e.g., genetic predisposition) others are attributable to the wider external social and environmental conditions outside the control of an individual (WHO, 2019).

2.4 Determinants and social determinants of health

Many factors, alone or combined together can influence an individual's health. These factors are also known as the determinants of health. Determinants of health constitute a broad range of factors that determine health. In particular, whether individuals will stay healthy or become ill is determined by circumstance and the environment. In general, the determinants of health help to understand how likely it is that someone stays healthy or becomes ill.

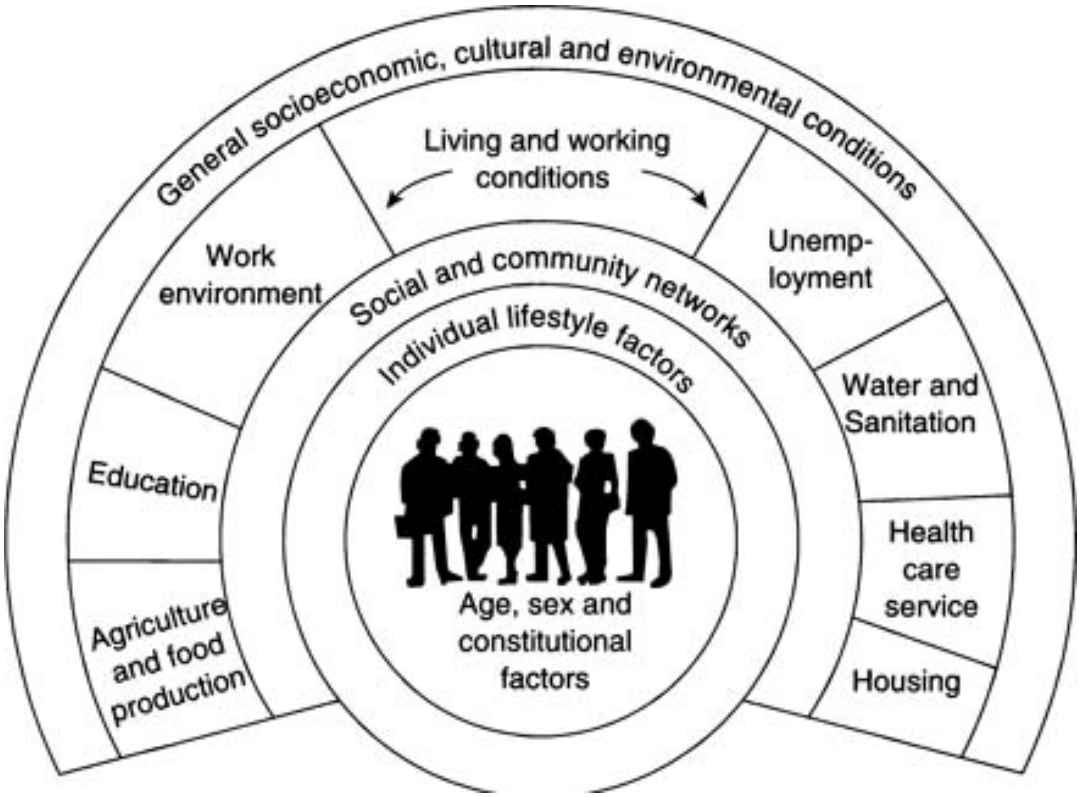
According to the WHO (2019c) determinants of health include:

- The social and economic environment,
- The physical environment, and
- A person's individual characteristics and behaviors.

Dahlgren and Whitehead conceptualize the determinants of health as a "rainbow-like" layer (Figure 3) (Dahlgren et al., 2006). The model shows that whilst an individual has no control over his/her age, sex and genetics, individuals are embedded in wider determinants of health

such as in living and working conditions which can affect the likelihood of becoming sick or even dying prematurely. These are also determinants that are theoretically modifiable by policy.

Figure 3. The main determinants of health

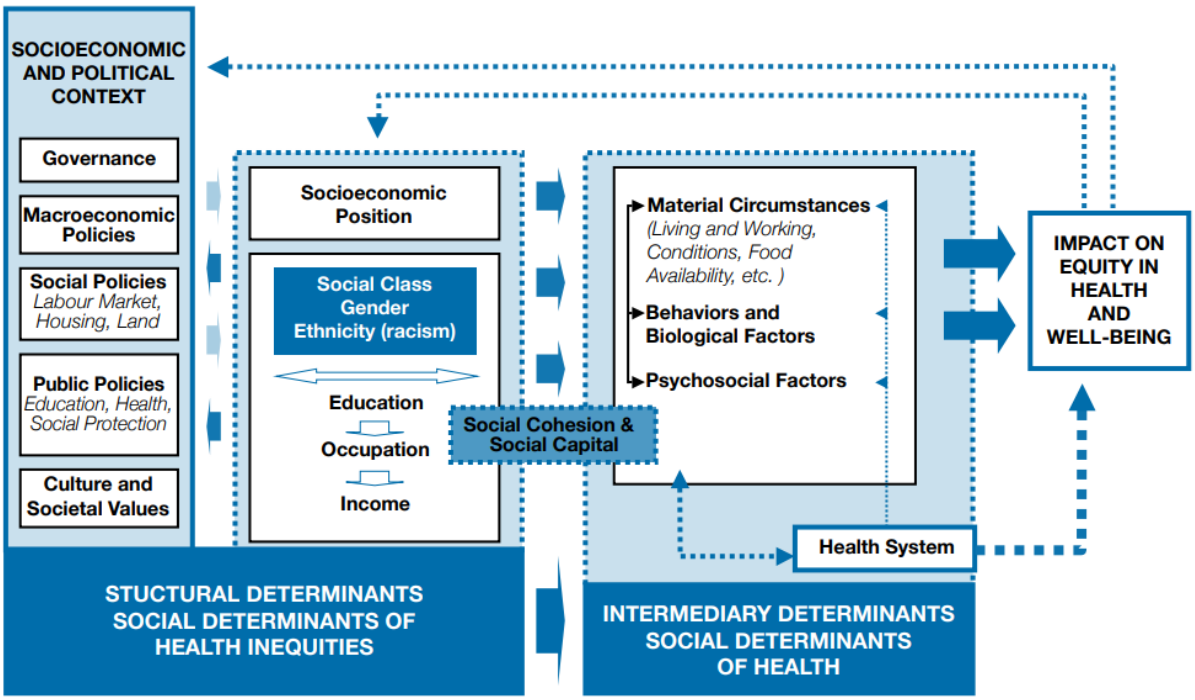


Note: Figure by Dahlgren and Whitehead (1991)

Ever since the Commission on Social Determinants of Health (CSDH) was established by WHO, in 2005, attention has shifted to the more specific ***social determinants of health.*** The CSDH (2008) defines the social determinants of health as "…conditions in in which people are born, grow, live, work, and age." The social determinants of health can affect a wide range of health, functioning, and quality-of-life outcomes and are shaped by the distribution of resources at global, national and local levels and are the main contributor for health inequities. In particular, determinants include income, education, and employment, working conditions, social support networks, environment and gender. The CSDH had developed a detailed conceptual framework for the social determinants of health (Figure 4). Bringing these various determinants from Dahlgren's and Whitehead's model on determinants of health together, the

framework by the CSDH, illustrates how social, economic and political mechanisms give rise to a set of socioeconomic positions, whereby populations are stratified according to income, education, occupation, gender, race/ethnicity and other factors. For the first time, a model also picks up on social cohesion and ***social capital*** as a social determinant of health.

Figure 4. CSDH conceptual framework for the social determinants of health



Note: Figure by CSDH (2008)

2.5 Determinants of mental health

Similar to health in general various social, psychological, and biological factors can determine a person's level of mental health. Apart from biological risks such as genetic factors, factors such as economic difficulties, trauma, stressful working condition, unhealthy lifestyles, gender discrimination and rapid social change all have been recognized as risks to mental health.

2.6 Foundations of social capital

Social capital is probably one of the trendiest terms used by academics, journalists, and politicians. Despite its popularity and its constant development, however, many different definitions of social capital and what it encompasses are available. Most often, the idea is

connected with thinkers such as Bourdieu (1986), Coleman (1988), and Putnam (1995). Since many fields of social science have contributed to the topic of social capital, including sociology (Bourdieu, 1986; Coleman, 1988), political sciences (Putnam, 1995), and anthropology (Smart, 2008), there are a number of competing definitions of the term, with some more frequently used than others. Most often, the idea is connected to thinkers such as Bourdieu, (1986), Coleman (1988), and Putnam (1995). However, it is believed that the term originated long before these authors; Putnam (2001) himself argues that the first to ever use the term social capital was Lyda Judson Hanifan in 1916. Hanifan was a state supervisor of rural schools in West Virginia and wrote the following in a piece titled "The Rural School Community Center":

"In the use of the phrase social capital I make no reference to the usual acceptation of the term capital, except in a figurative sense. I do not refer to real estate, or to personal property or to cold cash, but rather to that in life which tends to make these tangible substances count for most in the daily lives of a people, namely, good- will, fellowship, mutual sympathy and social intercourse among a group of individuals and families who make up a social unit, the rural community, whose logical center is the school." (Hanifan, 1916, p.130)

In this respect, Hanifan seems to emphasize everyday friendships and the informal and comforting support that results from it (Halpern, 2005). The definitions proposed by Bourdieu, (1986), Coleman (1988), and Putnam (1995) are discussed below, along with the theoretical differences between them.

Pierre Bourdieu (1930 – 2002)

Pierre Bourdieu was a French sociologist who probably provided the first modern systematic analysis of social capital (Portes, 1998). Bourdieu's study of social capital arose from his interest in the dynamics of power in society, and particularly in how powerful classes are able to retain their status. Bourdieu believed that this could not be explained by economics alone, but rather by the interaction of three forms of capital: economic, cultural, and social capital (Portes, 1998).

The definition of social capital, according to Bourdieu (1986) is:

"…the aggregate of actual or potential resources linked to possession of a durable network of more or less institutionalised relationships - of mutual acquaintance and recognition - or in other words to membership in a group ... which provides each of its members with the backing of the collectively owned capital, a "credential", which entitles them to credit in the various senses of the word". (Bourdieu, 1986 p. 241-58)[1]

In this sense, Bourdieu sees social capital as an individual good and not as a public good. Moreover, according to him, the attainment of social capital often requires trade with the other two forms of capital. He argues that without the investment of some material resources or cultural knowledge, individuals have difficulties establishing valuable relationships with others (Portes & Landolt, 2000). Bourdieu also has a clear view on the role that power and inequality have on social capital, and he stresses that more privileged groups in a society have more "power" to decide which networks are valuable and which ones are not (Eriksson, 2010).

James Coleman (1926 – 1995)

Another important figure when discussing the roots of social capital is James Coleman, an American sociologist. He defined social capital almost in parallel with Bourdieu but follows a slightly different approach. Coleman indicates that social capital is "productive", which means that it facilitates the achievement of a certain actions, while its absence does not (Coleman, 1988; Häuberer, 2011).

He also identifies three forms of social capital:

1) Obligations, expectations, and trustworthiness in the social structure,
2) Information channels, and
3) Norms and effective sanctions.

[1] Taken from: 'The Forms of Capital.' Pp. 241-58 in Handbook of theory and research for the sociology of education, edited by John G Richardson. New York: Greenwood Press.

Coleman (1988) defines social capital as follows: "Not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain action of individuals who are within the structure". (Coleman, 1988, p. S98)

Robert Putnam (1941)

Probably the most famous face of social capital by far is Harvard professor Robert Putnam. With his 1995 ground-breaking article "Bowling Alone: America's declining social capital" and his 2001 book by the same name, he brought the social capital discussion to a new level (Putnam, 1995, 2001). Putnam discusses how people in the US have become withdrawn from civic engagement and have become increasingly disconnected from family, friends and neighbors. Putnam's view of social capital contrasts that of Bourdieu but somewhat resembles Coleman's view. According to Putnam (1995) social capital refers to: "Features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit." (Putnam, 1995, 2000)

Unlike Bourdieu, Putnam emphasizes that social capital is a public good (Putnam, 2001). While for Bourdieu, social capital operates at the micro/individual level, for Putnam it also works at the macro and meso-levels of society. Furthermore, Putnam's concept of social capital includes five central characteristics[2]:

1) Trust in the community,
2) Civic engagement, including participation and use of civic networks,
3) Norm of generalized reciprocity, including a sense of obligation to help others and confidence in return,
4) Community networks, including voluntary, state, and personal networks and density, and
5) Local civic identity, including sense of belonging, solidarity, and equality with local community members.

[2] Adapted from: McKenzie & Harpham (2006)

Trust and local civic identity can be considered group rather than individual characteristics; they may reflect an ecological level of social capital (McKenzie & Harpham, 2006). Thus, Putnam's definition goes beyond the ordinary social network theory. Putnam's definition is probably the most often used in health research (McKenzie & Harpham, 2006).

Alejandro Portes (1944)

Another author whose name arises when researching social capital is Alejandro Portes (1998). In line with Bourdieu and Coleman, Portes also sees social capital as an individual attribute. However, Portes (1998) stresses that social capital defines resources accessible to individuals as a result of their social ties, but that these resources do not dwell within the individual. He believes that they reside in the structure of the social networks, instead. Portes (1998) broadly defines social capital as**:** "The ability of factors to secure benefits by virtue of membership in social networks and other social structures". (Protes, 1998, p. 6)

The definition suggests that individuals who belong to social networks are able to receive certain benefits that those without a social network are not able to receive. In sum, Bourdieu (1986), Coleman (1988), and Portes (1998; 2000) all consider social capital as an individual attribute, while Putnam (2001) sees it as a collective good as well.

2.6.1 More recent definitions

Although the popularity of the concept of social capital is largely due to Bourdieu's, Coleman's, and Putnam's work, over recent years more definitions have been proposed. For example, the OECD (2007) defines social capital as: "Networks together with shared norms, values and understandings that facilitate co-operation within or among groups." (OECD, 2007)

The World Bank, on the other hand, puts forth the following definition: "The institutions, relationships, and norms that shape the quality and quantity of a society's social interactions." (World Bank, 2011)

Table 1. Overview of social capital definitions

Author, year	Definition
Hanifan, 1916	(Social capital) is those tangible assets [that] count for most in the daily lives of people: namely goodwill, fellowship, sympathy, and social intercourse among the individuals and families who make up a social unit.
Bourdieu, 1986	"Social Capital is the aggregate of actual or potential resources linked to possession of a durable network of more or less institutionalised relationships - of mutual acquaintance and recognition - or in other words to membership in a group ... which provides each of its members with the backing of the collectively owned capital, a "credential," which entitles them to credit in the various senses of the word."
Coleman, 1988	(Social capital) is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain action of individuals who are within the structure.
Putnam, 1995	Features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit.
Portes, 1998	The ability of factors to secure benefits by virtue of membership in social networks and other social structures.
OECDC, 2007	Networks together with shared norms, values and understandings that facilitate co-operation within or among groups.
World Bank, 2011	The institutions, relationships, and norms that shape the quality and quantity of a society's social interactions.

Note: Definition presented in the Tables are original quotes

According to Kawachi, Subramanian, and Kim (2008), social capital can be understood as two separate concepts. First, it can be seen as the resources (e.g., trust and norms) available to members of social groups. Social groups can be the workplace, for example, but also voluntary organizations or the residential community. Second, social capital can also be seen as

resources, such as social support and information channels, that are derived from a person's network. Kawachi, Subramanian, and Kim (2008) measure social capital as both an individual's attribute and the property of a collective. Simply put, social capital can be seen as the resources that are derived from one's membership in social networks (Kawachi et al., 2008). Table 1 provides an overview of the most common definitions of social capital.

2.7 Types, forms, and dimensions of social capital

The increased interest in social capital has led to the creation of several types, forms, and dimensions of social capital. The types that are primarily described include

- Bonding,
- Bridging, and
- Linking social capital.

The forms and/or dimensions that are primarily portrayed include

- Cognitive and
- Structural social capital.

2.7.1 Bonding, bridging and linking social capital

Bonding social capital refers to links based on a common identity (e.g., family). People are similar to each other and have a shared social identity. It is characterized by an inward focus, homogeneity, strong norms, loyalty, and exclusivity. Consequently, some authors also refer to bonding social capital as exclusive (McKenzie & Harpham, 2006). Because bonding social capital often relies on strong social ties within one group and because of its "boundness," it is not always considered positive (Villalonga-Olives & Kawachi, 2017). Examples of negative group bonding include groups with adverse consequences for others such as Neo-Nazi groups and the Mafia (Baum & Ziersch, 2003). Also, in terms of health, bonding social capital can be both positive and negative. It can be seen as positive when a person belongs to a group that practices health promoting behaviors (e.g., abstinence from smoking), but it can also be seen as something negative, for example, when a person belongs to a community or group that

promotes the anti-vaccine movement or that regularly takes illicit drugs. Villalonga-Olives and Kawachi (2017) refer to this phenomenon also as the "dark side of social capital".

Bridging social capital refers to links that go beyond one's identity (e.g., colleagues). People are not alike in some sociodemographic sense but are more or less equal in terms of power and status. Unlike bonding social capital, bridging social capital is characterized by an outward focus, and people often belong to a heterogeneous group. Putnam (2000) writes "…bridging social capital can generate broader identities and reciprocity, whereas bonding social capital bolsters our narrow selves…" (Putnam, 2000, p. 23).

Bridging social capital is sometimes considered to be more fragile than bonding social capital, because the social ties between people are often weaker. Overall, bridging social capital is seen as more positive, as it connects people from different backgrounds and acts as a "sociological superglue" (McKenzie & Harpham, 2006).

Linking social capital, the third type, is similar to bridging social capital, but it comprises links that go beyond one's identity (McKenzie & Harpham, 2006). It often refers to relationships between individuals and groups in different social strata.

2.7.2 Structural and cognitive social capital

The various theoretical definitions of social capital have led to the distinction between different dimensions of social capital. In health research, two prominent dimensions are cognitive social capital and structural social capital.

Cognitive social capital describes the perception of level of trust and reciprocity. It refers to what people feel and consists of norms and values (McKenzie & Harpham, 2006). In health research, it is often measured by asking about whether the participant can trust the community or people in his or her close surroundings (e.g., teacher, co-workers).

Structural social capital refers to the relationships, networks, and institutions that link people together (McKenzie & Harpham, 2006). Structural social capital can refer to formal (e.g.,

school, religion, sports club) and informal (e.g., friends, family) networks (Harpham, 2008). Indicators of structural social capital, for instance, include people's actions, like interacting with neighbors or participating in events (Derose & Varda, 2009). Furthermore, researchers have proposed indicators such as density, strength of ties, and redundancy of interactions (Derose & Varda, 2009). Although this might be considered a less common approach in the social capital literature, it has a rich and relatively well-developed tradition (Derose & Varda, 2009).

Derose and Varda (2009) have suggested that there are in fact three dimensions of social capital: cognitive, structural, and ***behavioral***. According to these authors, behavioral social capital describes things that people do, such as voting, and that reflect social ties and resources within communities. It differs from structural social capital in the sense that it focuses on the number of actions taken (e.g., number of club meetings attended in the past year), and not density or strength of ties. Table 2, adopted from Derose and Varda (2009), presents the social capital indicators and the distinction between the bonding, bridging, and linking types of social capital across the cognitive, behavioral, and structural dimensions.

Overall, it is important to distinguish between cognitive and structural cognitive social capital because they have been linked to different health outcomes. For example, whereas high levels of structural social capital have been linked with poor mental health, high levels of cognitive social capital have been associated with better mental health.

Table 2. Types and dimensions of social capital and examples of indicators

	Structural	Cognitive	Behavioral
Bridging	• Strength of ties, weak ties	• Trust in people from other groups	• Membership - based attendance in heterogeneous group
Bonding	• Strength of ties, strong ties	• Trust in people from same group, belief that neighborhood is close knit	• Number of club meetings attended in past year
Linking	• Density of ties (e.g., number of contacts with community-based organization)	• Trust in community organization	• Wrote letter to government official

Note: Adapted from Derose and Varda (2009)

2.8 Social capital: an individual or collective feature

From the definitions above, it appears that social capital can be measured and analyzed at the individual level, but also at the collective level. Whether social capital is an individual or a collective feature and whether it should be seen as a micro-level or macro-level concept is probably one of the most discussed topics within social capital research (Portes & Landolt, 2000). The ongoing confusion stems from the different theoretical approaches described earlier: whereas Bourdieu (1986) and Coleman (1988) view social capital as an individual or small group (i.e., families) asset, Putnam (2000) emphasizes that it is a resource held by communities and nations (Putnam, 2000).

However, one can also argue that social capital is both: an individual feature and a collective feature. Halpern (2005) uses the example of cultural differences to explain this. When visiting a foreign country, for example, one cannot help but notice certain differences in the way people behave and the country itself works. For instance, when visiting Italy, Germans will be surprised that cars do not stop at stop signs (if they do, it is likely that someone will hit them

from behind) and that Italians like to straddle lanes on the road, along the lines: "Never use one lane when you can use two". Foreign visitors will be surprised by the British way of queuing and by the politeness in US supermarkets when the cashier greets them with "Hi, how are you?" and bids them goodbye with "Have a nice day." However, all these cultural habits and norms have one thing in common: they facilitate the nation's inhabitants co-existing with one another. The World Bank's recent definition of social capital includes such things as norms and culture (Grootaert & van Bastelaer, 2001).

"Social capital refers to the internal social and cultural coherence of society, the norms and values that govern interactions among people and the institutions in which they are embedded. Social capital is the glue that holds societies together and without which there can be no economic growth or human wellbeing." (Grootaert & van Bastelaer, 2001)

In addition, some researchers have stated that social capital is a "non-exclusive good," so it is not possible to exclude people from using the good (Rostila, 2008). For example, living in a highly trusting environment may be beneficial even for those who mistrust. At the state level, for instance, trust can increase political participation, which in turn can mobilize votes across the socioeconomic scale and push governments to be more responsive to polices focusing on the needs of the more disadvantaged by increasing welfare benefits (e.g., more access to health care) (Kawachi et al., 1999).

2.8.1 Micro, meso, and macro level of social capital

The various concepts and definitions of social capital have led to the establishment of different units of analysis. To date, the relationship between social capital and health has been studied at either the individual or micro-level or at the meso- and macro-level. Macinko and Starfield (2001) identify four levels when analyzing the association between social capital and health:

1. Individual psychological level,
2. Micro-level,
3. Meso-level, and
4. Macro-level.

However, the individual psychological level and the micro level are often grouped together and simply seen as the individual or the micro level. At this level, social capital consists of trust and norms and refers to interactions between individuals and families. The meso level refers to interactions in communities and neighborhoods. At the macro-level, social capital is based on legal, institutional, political, and economic conditions as well as cultural and historical factors. The focus of social capital at the macro-level is therefore larger, and the unit of analysis is often countries.

2.8.2 Social capital at the macro-level and health

Why does it matter if one looks at social capital from the micro or the macro-level? Let us consider suicide. One hundred and twenty-two years ago, David Émile Durkheim observed that suicide rates were generally stable but differed substantially between regions and societies (Durkheim, 1897; Halpern, 2005). Rates were much lower in Catholic nations than in Protestant nations and among married than divorced people, but higher among groups characterized by dislocation and loose social bonds (Durkheim, 1897; Halpern, 2005). He concluded that societies with stronger social bonds and high levels of social cohesion and solidarity seemed to have a protective effect on suicide (Halpern, 2005). On the whole, suicide is committed "so infrequently" that those who do it seldom share the same immediate network (the exception being mass suicide, where several people commit suicide together, typically manipulated by some kind of leader (Rajagopal, 2004). Therefore, it is plausible that higher suicide rates in one country are the result of higher-level factors, such as the economic and political context. Hence, the links may lie at the macro-level.

Harvard professor, Ichiro Kawachi, is probably the strongest advocate for social capital having an effect on health at the macro-level. Next to Durkheim, he conducted one of the first studies on macro-level social capital and health. In his 1997 cross-sectional ecologic study, Kawachi (1997) discovered a strong correlation between age-adjusted mortality rates and social capital (e.g., perceived lack of helpfulness by others ($r = 0.71$); social trust ($r = 0.79$)). Kawachi and colleagues replicated the study two years later, but this time tested whether this correlation also held for self-rated health. Once again, a correlation between social capital, in particular social mistrust, and fair/poor health was found (Kawachi et al., 1999). The authors also

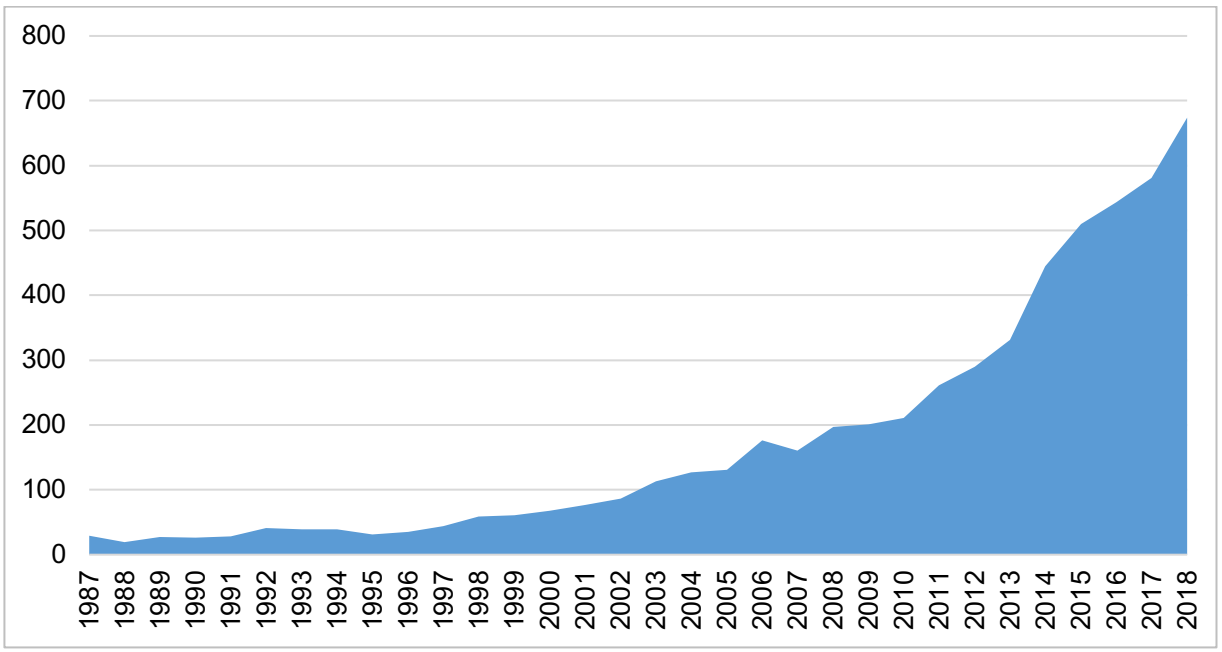
established that individuals living in low trust states were around 40% more likely to have fair/poor self-rated health (OR: 1.41, 95%CI: 1.33 – 1.50) compared to individuals living in high trust states (Kawachi et al., 1999).

Regarding the unit of analysis with which to investigate social capital and its effects, the ongoing disagreement presents a problem for many researchers. In health research, it is important to distinguish between the two for a simple reason: the level of analysis will give indications concerning whether social capital benefits the individual or the collective, and whether health promotion strategies should target the individual or entire places or regions (Subramanian et al., 2003).

2.9 Previous research on social capital and health

It is difficult to name the person who first introduced the concept of social capital to public health. While social capital per se is not a new concept, it has only recently garnered great interest among public health researchers. Ever since social capital has been identified as a possible health determinant, the literature on social capital and health has grown exponentially (Figure 5).

Figure 5. Scientific publications on social capital and health from 1987 to 2018



Note: Own design

Kawachi and colleagues (1997) were among the first to use the term "social capital" in relation to a health outcome. In an article on social capital and income inequality, published in the American Journal of Public Health, the researchers hypothesized that a) state variations in income inequality would predict the extent of investment in social capital, b) the degree of investment in social capital would anticipate state variations in total and cause-specific mortality, and c) that there would be a small residual direct association between state income inequality and mortality after controlling for investment in social capital (Kawachi et al., 1997). In their ecological analysis, the authors found that both group membership and social truest were associated with total mortality, coronary heart disease, malignant neoplasms, and infant mortality (Kawachi et al., 1997).

Social capital has since been linked to several health behaviors, such as cigarette smoking, physical activity, and dietary behavior, but also to mental health. For example, Lindström and Giordano (2016) investigated changes in individuals' cigarette smoking behavior considering determinants such as social capital. The authors found that active social participation was positively associated with smoking cessation (OR=1.39; 95% CI: 1.07 – 1.82). Johnson, Sharkey, and Dean (2010) found that social capital was significantly associated with higher fruit and vegetable intake (b= 0.410; $p<0.001$). Researchers from Sweden and Finland found that a low level of social capital was associated with depression in older adults (Forsman et al., 2012) and McPherson et al (2014) established that community-level social capital can influence mental health outcomes in adolescents.

2.10 Mechanisms of social capital's effects on health

In the early 1980s, Cohen and Wills (1985) presented two models, namely the main effect model and the stress buffering model, to explain the mechanisms by which social relationships could influence health. Kawachi and Berkman (2001) have also used these models to clarify how social ties and social capital can influence mental health.

The stress buffering model focuses on functional characteristics of social relationships (e.g., perceived support). The main effects model, in contrast, emphasizes the structural aspects of social relationships (e.g., social networks, social integration) (Kawachi & Berkman, 2001). For

example, it is thought that being involved in a social network can provide social support that may influence health by functioning as "buffering factors" for stress (Kawachi & Berkman, 2001). The perceived availability of support is believed to buffer the effects of stress by increasing coping abilities (Kawachi & Berkman, 2001). Furthermore, social capital can provide opportunities for (psycho)social support that, if accessed, will tend to decrease stress and improve health by acting as a buffering factor for stress (Bartley, 2016; Kawachi et al., 2008).

In addition, social capital may increase the diffusion of information on health-related behaviors. More individuals will thus possess such information and be able to apply it to improve their health. Social capital is also likely to lead to political organizing, which could result in more health resources being brought into a given area. In turn, this could improve access to health care and thereby enhance health. There is evidence that individuals living in areas or communities with higher levels of social capital, enjoy better mental health (De Silva et al., 2005).

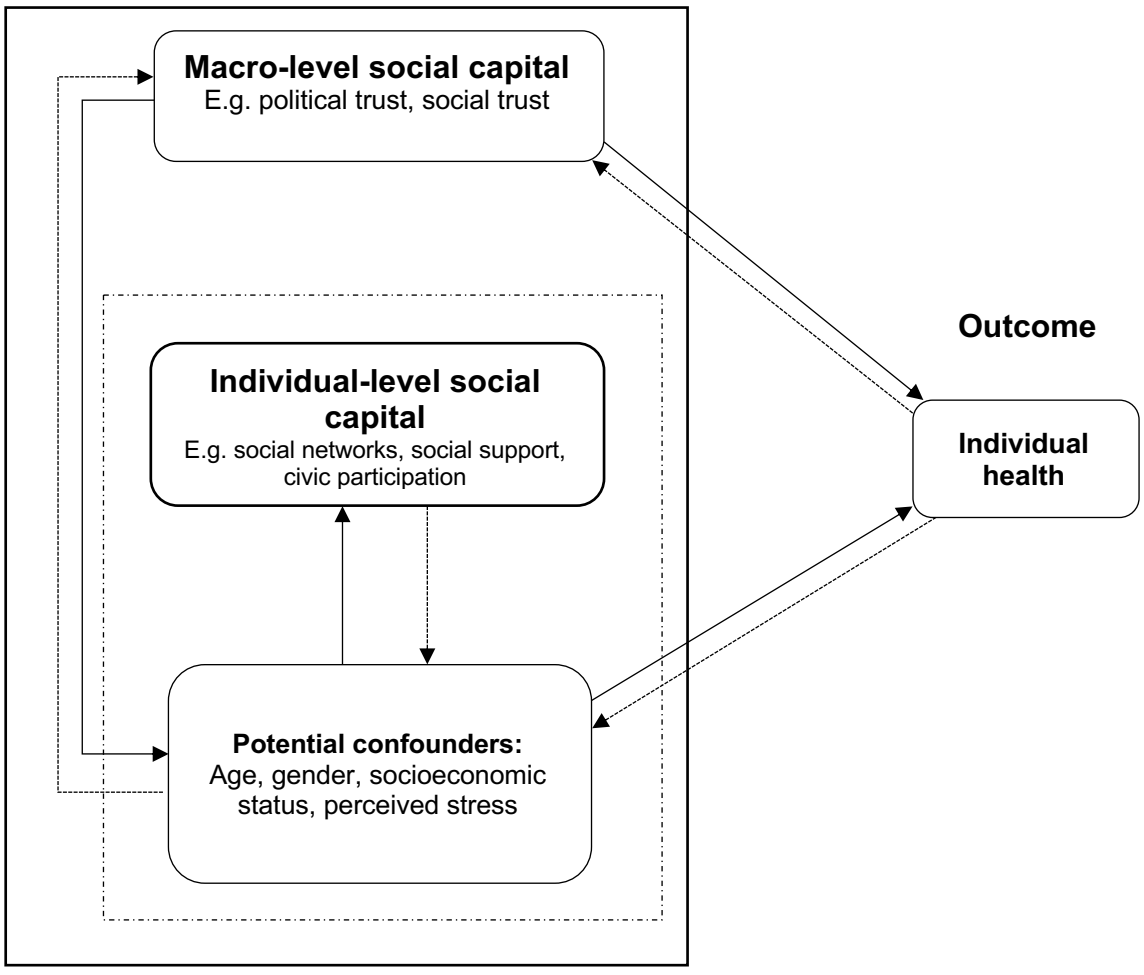
However, an important caveat is that social capital can be considered a "double-edged" phenomenon: while its effects on health may be positive, they can also be negative (Villalonga-Olives & Kawachi, 2017). Christakis and Fowler's (2007) work provides an example of behavioral social-contagion (Villalonga-Olives & Kawachi, 2017). These authors investigated the extent of the person-to-person spread of obesity as a possible factor contributing to the obesity epidemic, and established that person's chance of becoming obese is greater if he or she had an obese friend (Christakis & Fowler, 2007). Thus, social capital does not always promote health but can cut both ways. This is often referred to as the "dark side" of social capital (Villalonga-Olives & Kawachi, 2017).

2.11 Theoretical model

To contribute to the theoretical structure of this research, a conceptual model of the effect of social capital on health was developed. One issue that remains is whether social capital determines health or vice versa. On the one hand, social networks can provide social and emotional support that can act as a buffering factor for stress (Kawachi & Berkman, 2001) and

diffuse favorable health-relevant behaviors via social influence and social learning (Valente et al., 2004). On the other hand, poor health may negatively influence social capital. People with high levels of depressive symptoms and low levels of quality of life may also have lower levels of social capital because it is more difficult for them to be connected and to be socially active (Figure 6). The dotted arrows demonstrate the assumption of a causal relationship between social capital, individual factors, and health risk factors. The causal relationship can go both ways: specifically, social capital may influence health, but health may also influence social capital. The elements of the conceptual framework have been drawn from a review of public health literature addressing social capital.

Figure 6. Conceptual model of macro- and individual-level social capital's effects on individual health



Note: Own design

Potential confounders

Individual factors consist of sociodemographic factors including age, sex, and socioeconomic status (SES). Sociodemographic factors are strongly related to health (Marmot et al., 1997). Good health is more commonly found among those with a higher SES, whereas individuals of a lower SES suffer a greater burden of disease and disability and often die younger (Marmot, 2017).

Health risk factors

Excessive alcohol consumption, smoking, and physical inactivity are included in the component of health risk factors. Cumulative evidence has shown strong relationships between depression, alcohol consumption, smoking, and physical inactivity (Biddle, 2016; Pedrelli et al., 2016).

Social capital

Social capital is the main component of the model. Broadly, social capital includes the availability of social support and involvement in social networks (Kawachi et al., 2008). This involvement could, for example, be participation in a religious organization or sports club. Research has shown that social capital can have beneficial effects on mental health (Kawachi & Berkman, 2001). Both macro-level and micro-level social capital exist (see section 3.4.1).

2.12 Chapter summary

The rapid increase in the use of the term social capital across various disciplines has generated different emphases on certain dimensions and understandings of social capital. The works of Bourdieu (1986), Coleman (1988), and Putnam (1995) provide the theoretical roots of the social capital literature. However, to date no set definition of the term exists. The main difference between the perspectives in the social capital literature is in whether social capital is a private good/an individual attribute (e.g., the individual who "owns" it benefits from it) or a public good/group attribute (e.g., benefits members of the entire society). In line with Kawachi, Subramanian, and Kim (2008) and Putnam (2001), social capital can be considered both a group and an individual attribute. While one may claim that in some key features, the concepts are too different to combine, I argue they have a common focus: the value of social networks.

Therefore, this thesis refers to social capital as features of social structures, including norms, interpersonal trust, and mutual support, that act as resources for individuals and groups.

Chapter 3: Significance of the research

3.1 Introduction

This chapter highlights the significance of the research. It begins by pointing out inequalities in health-related quality of life, health risk behaviors (e.g., hazardous alcohol consumption) and psychological health between the general and the university student population. The chapter ends by highlighting the scientific contributions of this study relating to social capital and health research.

3.2 Students' well-being, quality of life, and health risk behavior

The following section describes inequalities in health-related quality of life, health risk behaviors and psychological health between the general and the university student population.

Quality of life and health-related quality of life

Adolescents and young adults, including university students, are generally considered to have a high potential for good health as they belong to a privileged group based on their age and social status. However, recent evidence has shown that university students often perceive their quality and health-related quality of life lower than the general population (Backhaus et al., 2019; Ogunsanya et al., 2018; Vaez et al., 2010). Ogunsanya and colleagues (2018), for example, found that among international students, the mental HRQOL scores were lower than the norm of the US general population. In a similar vein, a Swedish study revealed that first-year university students' average perceived quality of life and self-rated health was significantly lower than that of their same-age counterparts working full-time (Vaez et al., 2004). Moreover, researchers in the UK found that students scored significantly worse on all eight dimensions (physical functioning, physical role functioning, bodily pain, general health, vitality, social functioning, emotional functioning, and mental health) of the SF-36, a measure of health status, than their peers in the local population (Stewart-Brown et al., 2000).

Health risk behavior

University students are also vulnerable to destructive behaviors. Research has demonstrated that compared to the general population, university students are more likely to engage in health risk behaviors, such as the hazardous consumption of alcohol (Krieger et al., 2018; Slutske, 2005). In fact, students are often perceived to be the heaviest young drinkers (Krieger et al., 2018; Slutske, 2005). A study from New Zealand comparing scores on the Alcohol Use Disorders Identification Test (AUDIT) found alarming differences between students and non-students aged 18 to 23 years old: on average, university students' mean AUDIT scores were 50–60% higher than those of the general population (Kypri et al., 2005). Another health risk behavior is physical inactivity. Kwan (2016) found that overall physical activity decreased with age, but that this decrease was steepest among those entering university. Other common destructive behaviors include smoking and (illicit) drug use (Bennett & Holloway, 2015; Karadoğan et al., 2018; Sommet et al., 2012). For both smoking and drug use, higher rates have been reported among the student than the general population. A UK investigation, for instance, found that students were 4.3 times more likely than non-students to have consumed ketamine[3], in the last 12 months (Bennett & Holloway, 2015). Furthermore, a cross-sectional study from Turkey established that university students had higher smoking rates than the country's average (Karadoğan et al., 2018).

Psychological health

University students also have higher rates of mental health problems, such as elevated levels of distress, anxiety, and depression, than the general population (Ibrahim, Kelly, Adams, et al., 2013; Rosenthal & Okie, 2005). A survey undertaken at three universities in the UK revealed that students had significantly worse emotional health than the general population, scoring more than 20 points lower (Stewart-Brown et al., 2000). In a study conducted among Australian university students, Stallman (2010) found that 19.2% of subjects experienced high levels of distress, compared to only 3% of the general population (Stallman, 2010).

[3] Ketamine is a drug usually used to start and maintain anesthesia.

3.3 Significance of the research

The increase in health problems among university students poses a public health issue for many reasons. First, health problems reduce students' performance and jeopardize the success of their studies. Health problems during the university years have been associated with a decreased energy level and concentration difficulties, consequently hindering students' performance and often resulting in lower grade point averages and college retention (Bruffaerts et al., 2018; De Luca et al., 2016). Second, disruption in academic performance may have additional long-term consequences, such as limiting future employment and earning potential (Zimmermann et al., 2015). Third, considering the demographic change, university students represent a special group of the population that is important for the sustainability, economic growth, and social development of a country (Stewart-Brown et al., 2000). Therefore, it is critical to elucidate risk and protective factors for health problems among university students.

Presently, there is a lack of studies assessing factors that go beyond traditional health determinants (e.g., socioeconomic status, physical activity). The lack of such data is an important public health problem because it can lead to poor planning for health services delivery.

3.3.1 Contributions

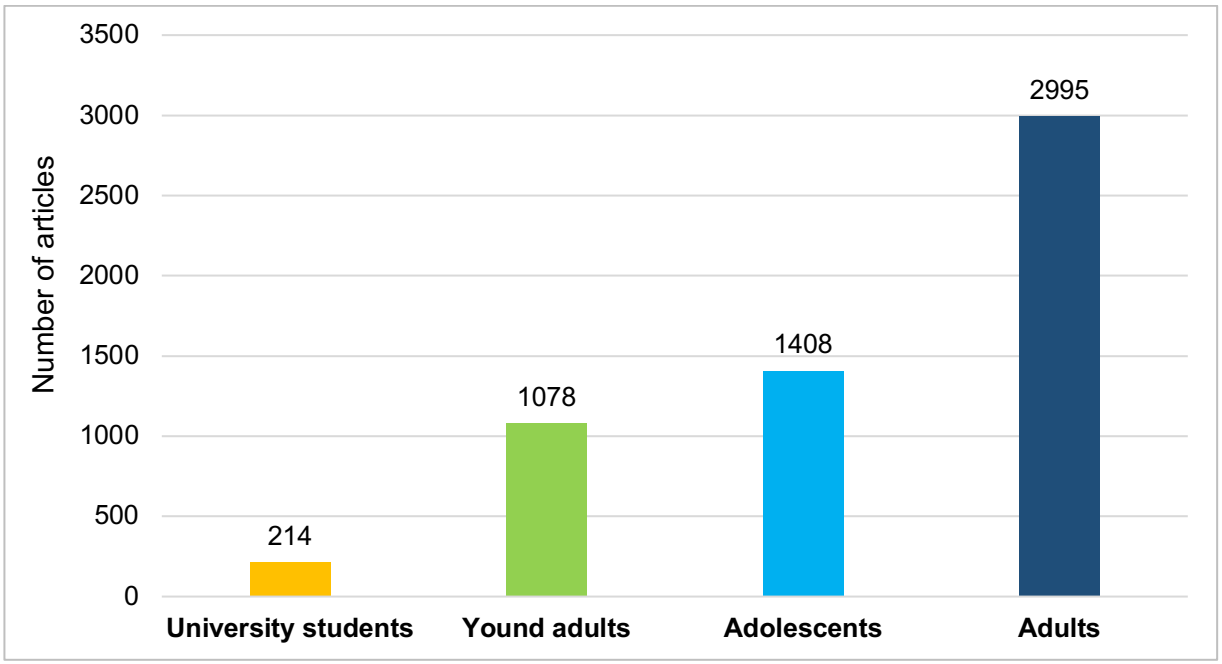
The concept of social capital has been applied in numerous fields of study, including psychology, economics, political science, and epidemiology, as well as among various population groups (Kawachi et al., 2008; McKenzie & Harpham, 2006; Putnam, 2001). Borges et al. (2010) examined the association between social capital and self-rated health among Brazilian adolescents; Winstanley et al. (2008) investigated whether adolescents' perceptions of neighborhood disorganization and social capital determined alcohol or drug use and dependence; and Bassett and Moore (2013) explored the association between social capital and depressive symptoms among adults. Furthermore, past research on university students has generally provided evidence for micro-level characteristics (age, gender, lifestyle behavior) as risk factors for health, while only a few researchers have examined whether country

characteristics (e.g., economic performance) change the probability of being depressed. Likewise, past research on social capital and health has mainly focused on micro-level/individual-level effects (Eriksson, 2010; Kawachi et al., 2008; Murayama et al., 2012). In general, this is due to the use of single-country databases. Depressiveness and the factors behind it as well as social capital may vary with social factors and by geographic context. Therefore, cross-country research is needed to enable comparisons and identify possible levers from a broader perspective. In summary, most studies investigating students' health and the relationship between social capital and health

a) have dealt with individual-level factors (e.g., physical inactivity),
b) have examined adolescents, adults, or the elderly (Figure 7), and
c) have not used multilevel data – in fact, evidence from multilevel analytic studies on the effect of social capital on health is still limited at present (Murayama et al., 2012).

Thus, this study is the first one to focus on university students and to utilize multilevel data. The results of the study may generate new ideas regarding appropriate prevention strategies and interventions for addressing (mental) health issues in university students.

Figure 7. PubMed entries for social capital and health by generation



Note: Own design, search performed: August 6th, 2019

3.4 Chapter summary

Poor HRQOL and mental health problems among university students are a source of concern for researchers worldwide. Poorer health may result when students feel overwhelmed and do not have the necessary social support systems to help them cope with these stressors. Perception of social support by family and friends as well as access to social capital may serve as protective factors against the development of depressive symptomology, suicidal ideation, and poor self-rated health.

University students represent a particular group of the population. They are usually in their most productive and most active years of their life. The transition to university is a critical period in the formation of young adults' life pathways. The academic pressure and the possible new independence that come with starting university have been proposed as risk factors for poor health (Arnett, 2000; Bayram & Bilgel, 2008). In this context, many university students experience the onset or an exacerbation of their mental health problems (Pedrelli et al., 2015). Given the risks and consequences associated with mental health problems during the university years, it is imperative to examine what makes students sick and what keeps them healthy. Finally, the university setting may be one of the last settings where it is possible to address the health of a large proportion of young adults.

Traditional research exploring students' mental health has focused primarily on individual-level characteristics (age, gender, lifestyle behavior) as risk factors for depressiveness. Moreover, to date most social capital research has examined the micro or individual level (e.g., individual level of trust) aspect of social capital, while evidence regarding the macro-level (e.g., countries, states, regions) is limited (Kawachi et al., 2008). In general, this is due to the use of single-country databases. The question of whether certain social determinants and country characteristics (e.g., economic performance) change the probability of suffering from poor health or of being depressed remains underexplored (Geisner et al., 2012; Ngin et al., 2018; Steptoe et al., 2007).

Chapter 4: Research aims

The following section provides the research aims and hypotheses formulated to direct part I of the thesis. Based on the theoretical framework and the literature review presented in the previous chapters the overarching research question for the current study is "do social factors such as a lack social capital contribute to the poor health of university students?" The major aims of this study are defined below.

Aim 1: To describe the prevalence of depressive symptoms, the levels of suicidal ideation and self-rated health among first-year university students in 12 countries.

Aim 2: To explore the association between social capital and depressive symptoms, suicidal ideation, and self-rated health among first-year university students.

Aim 3: To determine whether first-year university students with a lower stock of social capital are at greater risk for depressive symptoms, suicidal ideation and poorer self-rated health.

Aim 4: To study the association between individual-level factors and depressive symptoms, suicidal ideation, and self-rated health among first-year university students.

Aim 5: To investigate the association between contextual factors and depressive symptoms, suicidal ideation, and self-rated health among first-year university students.

4.1 Research hypotheses

Based on the above specific research aims, the following null hypotheses (H0) and alternative hypotheses (Ha) were developed. The first digit refers to the number of the aim. For example, *'Hypothesis 2'* refers to Aim 2, and so on.

Hypothesis 2

H0: There is no association between social capital and depressive symptoms, suicidal ideation, and self-rated health among first-year university students.

Ha: There is an association between social capital and depressive symptoms, suicidal ideation, and self-rated health among first-year university students.

Hypothesis 3

H0: First year university students reporting lower levels of social capital do not demonstrate more depressive symptoms, greater suicidal ideation and poorer self-rated health.

Ha: First year university students reporting lower levels of social capital demonstrate more depressive symptoms, greater suicidal ideation and poorer self-rated health.

Hypothesis 4

H0: There is no association between individual-level factors such as perceived stress and depressive symptoms, suicidal ideation, and self-rated health among first-year university students.

Ha: There is an association between individual-level factors such as perceived stress and depressive symptoms, suicidal ideation, and self-rated health among first-year university students.

Hypothesis 5

H0: There is no association between country-level factors such as perceived stress and depressive symptoms, suicidal ideation, and self-rated health among first-year university students.

Ha: There is an association between country-level factors such as perceived stress and depressive symptoms, suicidal ideation, and self-rated health among first-year university students.

Chapter 5: Methodology

5.1 Introduction

Based on the literature review, theoretical framework, and research questions presented in the previous chapter, the SPLASH study was developed. This chapter describes the procedures and methods employed. A brief outline of the SPLASH study is first provided, and the study procedures, including the data collection, are then described. Finally, the data analysis strategy is presented.

5.2 Study Design

The present dissertation uses data collected between the academic year 2018 and 2019. Therefore, it exhibits a cross-sectional design.

5.3 The SPLASH study

The SPLASH study is an international two-wave panel study with the objective of investigating the influence of social capital on students' health. Data is collected at universities across the globe (e.g., Australia and Brazil). The choice of universities was based on personal affiliations and on the aim of including students from diverse backgrounds worldwide. A full list of researchers and participating universities is provided in the Appendix A. Universities elected to participate in SPLASH study and there were no exclusion criteria for institutional enrollment. At each institution that enrolled in the SPLASH study a random sample of degree-seeking students over the age of 18 was recruited to participate in the survey.

5.4 Data used

The present dissertation utilizes data collected from the first wave of the SPLASH study, collected during the 2018-2019 academic year. Data was collected at 13 universities in 12 countries including Albania, Australia, Brazil, Germany, Italy, Kosovo, Malaysia, Oman, South Korea, Switzerland, Taiwan, and the USA. In the present study, between one and two universities were sampled in each country and all first-year students in the participating in

were invited to complete a self-administered questionnaire (Appendix C). The purpose of the first wave of the SPLASH study is to examine the association between university students' social capital and psychological health.

5.4.1 Ethical considerations

The study received ethical approval by institutional review boards and ethics committees at all participating institutions (Appendix B). The study team followed standard practices of research to protect the privacy of all participants and to maintain confidentiality. Any identifiers of the participants were removed and replaced by a unique identification code. Participants' information and identification codes are kept in a database in a separate file on an encrypted computer. No names or other identifying information will be included in any publications or presentations based on the data.

5.4.2 Reducing the risk associated with emotional distress

Since the questionnaire included sensitive questions (e.g., concerning suicidal ideation) that could cause distress in respondents, particularly those with pre-existing conditions and/or emotional vulnerabilities, an information sheet about local and university mental health counselling centers was provided. Furthermore, participants were assured that they did not have to answer questions with which they felt uncomfortable and that they could terminate participation at any point while filling out the questionnaire.

5.4.3 Participants

Participants included university students from Albania, Australia, Brazil, Germany, Italy, Kosovo, Malaysia, Oman, South Korea, Switzerland, Taiwan, and the US. To be included in the study, participants had to meet the following criteria:

a) Aged between 18 and 30 years,
b) Enrolled full-time at one of the participating universities, and
c) Attending their first year of study.

Individuals were excluded from the study if they met any of the following criteria:

a) Younger than 18 or older than 30 years, and
b) Not enrolled full-time at one of the participating universities.

5.4.4 Data collection

All incoming first-year students at the participating universities were invited to participate in the study. The first round of SPLASH surveys was based on a convenience sample of universities based on personal affiliations, and on the aim of gathering students from diverse backgrounds across Europe.

The sampling scheme of students differed by country. University students from two universities (Italy and Germany) participated during regular lessons, while students from the remaining universities did so online. In case an in-class paper-and-pencil assessment of the instruments was not possible, students were invited to complete an online version of the assessments using an online tool (e.g., Qualtrics or RedCap). Courses were selected randomly, and students were invited to fill out the self-administered questionnaire either at the beginning or at the end of a lecture. The composition of the questionnaire was based on a comprehensive review of the literature. For the online version, students were given a hyperlink to access the questionnaire. The online questionnaires had exactly the same structure as the physical version.

Each questionnaire included a participant information section outlining the research aims and objectives. These text statements varied across schools and were approved by the institutional review boards of the universities coordinating the surveys in each country. Participation in the study was voluntary and anonymous. While at some institutions it was enough to inform students that they were providing their informed consent to participate by completing the questionnaire, other institutions required a formal approach, and students were asked to sign an informed consent form. Prior to participating, students were informed that they could terminate their participation at any point while filling out the questionnaire. Students were also informed that they did not have to answer questions that made them uncomfortable.

5.5 Sample size

The sample size was calculated with a sensitivity of 95%, a margin of error of no more than ±5% and using the estimated prevalence of depressive symptoms (mild/moderate) in each country (i.e. each university). The following estimated prevalence rates of depressive symptoms (mild/moderate) were used for the calculations:

- 19.9% in Albania (Pilika & Simaku, 2017),
- 26.1% in Australia (Schofield et al., 2016),
- 14.0% in Brazil (Silva et al., 2014),
- 9.9% in Germany (Busch et al., 2013),
- 6.7% in Italy (Binkin et al., 2010),
- 25% in Kosovo (Džubur et al., 2018)
- 21.0% in Malaysia (Yeoh et al., 2017),
- 27.7% in Oman (Al-Busaidi et al., 2011),
- 21.4% in South Korea (Seo & Je, 2018),
- 18.9% in Switzerland (Baer et al., 2013),
- 32.6% in Taiwan (Chen et al., 2015), and
- 7.6% in the USA (Pratt & Brody, 2014).

Furthermore, the number of students enrolled at each university is considered (Appendix A). Based on the calculations, the following numbers of student should be sampled in each country:

- n= 243 students from Albania,
- n= 290 students from Australia,
- n= 183 students from Brazil,
- n= 137 students from Germany,
- n= 96 students from Italy,
- n= 283 students from Kosovo,
- n= 252 students from Malaysia,
- n= 289 students from Oman,
- n= 256 students from South Korea,
- n= 234 students from Switzerland,

- n = 331 students from Taiwan, and
- n= 216 students from the USA (n=108 Harvard University, n=108 Baylor University).

The following formula was used to calculate the sample size:

$$n = \frac{n}{1 + (\frac{z^2 x\ p(1-p)}{e^2 N}}$$

Assuming a possible incomplete data rate of 20%, the final sample for each university/country is:

- n1= 303 students from Albania,
- n1= 362 students from Australia,
- n1= 228 students from Brazil,
- n1= 171 students from Germany,
- n1= 120 students from Italy,
- n1 = 353 students from Kosovo,
- n1= 315 students from Malaysia,
- n1= 361 students from Oman,
- n1= 320 students from South Korea,
- n1= 292 students from Switzerland,
- n1= 413 students from Taiwan, and
- n1= 270 from the USA (n=216 Harvard University, n=216 Baylor University) should be sampled.

The overall sample size for this study is therefore n= 3,508 students. The following formula was used to calculate the sample size considering missing data:

$$n1 = \frac{n}{\left(1 - \left(\frac{z}{100}\right)\right)}$$

5.6 Variables and measures

The following section describes the variables and instruments used to assess the association between social capital and students' health.

5.6.1 Dependent variables

To provide a complete description of the health status of university students, health status was measured by three outcomes: depressive symptoms, suicidal ideation, and self-rated health. The main focus was on depressive symptoms, while the secondary focus was on suicidal ideation and self-rated health.

Main health outcome

Depressive symptoms

The main health outcome was depressive symptoms, measured using the simplified Beck Depression Inventory (BDI-S) (Schmitt & Maes, 2000). The BDI-S measures the severity of depressive symptoms on a six-point Likert response scale with two extreme categories labelled 0 = "Never" and 5 = "Almost always." Sample items include, "I feel sad," "I have thoughts of killing myself," "I have to force myself to do anything," and "I have no appetite." A single unweighted score for individual respondents can be computed by summing their responses for all items of the scale. The authors of the BDI-S have demonstrated its construct validity (Cronbach's α = 0.93) (Schmitt et al., 2003; Schmitt & Maes, 2000). In the present study, Cronbach's alpha was comparably high (α = 0.91). The authors have also provided standard values for detecting clinically relevant depressive symptoms, with a cut-off score at ≥35 representing such symptoms (Schmitt et al., 2006).

Secondary health outcomes

Suicidal ideation

Students' suicidal ideation was based on item 9 of the BDI-S, which asked students to indicate whether they have had thoughts about killing themselves. The suicide item on Beck's depression inventory is considered a robust predictor of suicide attempts (Green et al., 2015).

Self-rated health

Self-rated health was measured using item 1 of the Optum SF-12v2. At the beginning of SF-12v2, respondents were asked to rate their general health on a five-point scale with the following response options: 1 = "Excellent," 2 = "Very good," 3 = "Good," 4 = "Fair," and 5 = "Poor" (Michalos, 2004). For the analysis, the responses were dichotomized with fair/poor health versus the rest.

5.6.2 Main predictor variable

At the individual level, students' key sociodemographic (e.g., age, gender) and family socioeconomic (e.g., parental level of employment and education) characteristics were considered, along with the following main predictor variable: Social capital.

Social capital

The World Bank Integrated Questionnaire to Measure Social Capital (IQ-SC), a psychometrically validated instrument, was used to measure social capital (Grootaert et al., 2004). This instrument contains 27 items and is divided into six different dimensions of social capital:

a) Groups and network,
b) Trust and solidarity,
c) Collective action and cooperation,
d) Information and communication,
e) Social cohesion and inclusion, and
f) Empowerment and political action.

Since the IQ-SC has no overall scoring algorithm, 14 items of the total 27 were selected. This was done in collaboration with Prof. Kawachi, from the Harvard T.H. Chan School of Public Health, who is an expert on social capital and health studies. For the analysis, the social capital items were divided into cognitive dimensions of social capital and behavioral dimensions. While the dimensions were mainly used as binary variables (low vs. high level of social capital) in some sections of the results I also report them using a continuous scale (low to high).

Cognitive dimension

The cognitive dimension of social capital was assessed using a total of five questions about:

a) Trust in others,
b) Perceived helpfulness by others, and
c) Perceptions of whether one could borrow money from others in case of need.

Four questions were measured on a five-point Likert scale (i.e., 1 = "Strongly agree" to 5 = "Strongly disagree"), while one question had a binary outcome (i.e., 0 = "You can't be too careful" or 1 = "People can be trusted"). Composite scores for the individual five items were calculated by summarizing the individual sub item scores, such that a high score indicated higher levels of cognitive social capital. Cronbach's alpha for the cognitive dimension was α = 0.71.

Behavioral dimension

The behavioral dimension of social capital was measured by:

a) Participation in community activities in the last 12 months,
b) Time or monetary contribution to a community project,
c) Whether the participant belonged to a group,
d) Whether the participant had a close friend, and
e) Whether the participant had gathered with people to have food or drinks in the last month.

Items were either binary (yes/no) or rated on a Likert scale, with all scales coded (or recoded where necessary) so that higher values represented higher levels of social capital. Cronbach's alpha for the behavioral dimension was α = 0.72. The approach of computing cumulative scores has been previously applied by other researchers (Mitchell & Bossert, 2007).

Social capital at a collective level

To consider social capital at the macro-level, the individual responses were aggregated. This is commonly done within the collective approach (Kawachi et al., 1997, 1999).

5.6.3 Control variables

The following demographic and individual-level characteristics were included as predictors of health outcomes since they might correlate with (psychological) health and social capital.

Gender

Gender was dummy coded with 0 = male, 1 = female, and 2 = other than male or female. The latter was included for students who might identify as neither male nor female, but only seven students selected this option. Due to the small sample size, they were excluded from the analysis.

Age

Age was measured on a continuous scale by asking respondents to indicate how old they were.

Nationality, race, and ethnicity

Students were asked to indicate their nationality or race and/or ethnicity. It is important to note here that in some countries, it is more ethically correct to ask for nationality, race, and/or ethnicity, while in other countries it is appropriate to simply ask for nationality.

Family socioeconomic status

Parental educational background and employment status were used as indicators of family SES. It is important to note that due to the different educational systems between countries, the answer options varied slightly. However, overall the categories for parental education ranged from "No formal education" to "Postgraduate education." Parental employment status was measured using four categories, ranging from "Not working for pay" to "Working at least full-time for pay." For the analysis, the variables for parental educational background and parental employment status were dummy-coded, with 1 referring to "At least some education" and 0 to "No formal education," and with 1 referring to "Working for pay" and 0 to "Not working for pay," respectively. A cumulative score was then calculated.

Field of study

Students' field of study was assessed by asking them to indicate in which course they were enrolled full-time. Since a total of 40 different study programs were named, students were clustered into the following groups: humanities, social sciences, natural sciences, formal sciences, applied sciences, business, and other studies. Table 3 shows the clusters of the study programs in detail.

Perceived stress

Perceived stress was measured using Cohen's Perceived Stress Scale (PSS-10) (Cohen et al., 1983), which constitutes ten questions on the extent to which a respondent has considered life stressful in the last month. Questions focus on how unpredictable, uncontrollable, and overloaded respondents find their lives and includes a five-point Likert response scale ranging 0 = "Never" to 4 = "Very often." The PSS-10 has been widely shown to demonstrate validity and reliability (Andreou et al., 2011). In the present study, Cronbach's alpha was acceptable at $\alpha = 0.73$.

Alcohol consumption

Alcohol consumption was assessed using the AUDIT-C, which consists of the first three items of the full AUDIT (Bush et al., 1998; Saunders et al., 1993). The AUDIT-C measures the typical frequency of alcohol consumption, the usual quantity per occasion, and the frequency of heavy episodic drinking (six or more drinks per occasion). Several studies have found the AUDIT-C to be valid and reliable across various settings and different racial/ethnic groups, and among the student population (Campbell & Maisto, 2018; Seth et al., 2015). In the present study, Cronbach's alpha was high ($\alpha = 0.95$). Scores for the AUDIT-C range from 0 to 12, with higher scores indicating a more hazardous drinking pattern. For the general population, an AUDIT-C score of 4 or higher for men and a score of 3 or higher for women is considered positive for alcohol misuse (Dawson et al., 2005; Rumpf et al., 2002). However, DeMartini and Carey (2012) have suggested optimized scores for university students, defining hazardous alcohol consumption with an AUDIT-C score of 7 or greater for men and 5 or greater for women. It is important to note that, due to national legislation, it was not possible to assess alcohol intake in Oman.

Table 3. Clusters of study programs

Group	Study program
Humanities	Arts and athletics, Islamic studies, music and art, art, history, philosophy, theology, linguistics, literature, languages
Social sciences	Psychology, sport and exercise science, sociology, educational sciences, political sciences, international studies, social sciences, Asia Europe studies, liberal arts
Natural sciences	Biology, chemistry, physical sciences, biotechnology
Formal sciences	System analysis, information technology, computer sciences, mathematics
Applied sciences: engineering and technology	Engineering, technical studies
Applied sciences: medicine and health	Medicine, dentistry, public health, health sciences, nursing, radiology, biomedicine, physical education
Other studies	Architecture, administration, communication

Physical activity

Physical activity levels were measured using the short form of the International Physical Activity Questionnaire (IPAQ). The IPAQ has been recognized as a valid and reliable tool and consists of seven questions asking respondents to report the number of days and the duration of their vigorous, moderate, and walking activity during the last week (Craig et al., 2003; Hagströmer et al., 2006). The level of physical activity referred to in the questionnaire is presented in metabolic equivalents (METs) (walking = 3.3 METs; moderate physical activity = 4.0 METs, and vigorous physical activity = 8.0 METs). Based on students' MET scores, they were assigned to one of the following three categories of physical activity levels: low, moderate, and high. The calculation of the metabolic equivalent (MET-min/week) was performed according to the following formula:

MET value × minutes of conducted sports activities during the day × days per week

For example, the calculation of MET for high-intensity physical activity according to the formula is 8 × 90 min × 5 days = 3600 MET- min/week. The classification was based on the definition by the IPAQ, as shown in Table 4.

Smoking habit

Smoking status was evaluated by questions developed by the WHO(de Bruin, 1996). Among others, question included: "Do you smoke?", "Have you ever smoked?". For the analysis students were grouped in either "Non-smoker" or "Ever smoker". Students who indicated to have smoked at some point during their life as well as students who indicated to currently smoke were categorized as "Ever smoker".

Table 4. Criteria for the intensity of physical activity according to IPAQ

Intensity of physical activity, IPAQ short version	**Criteria**	**MET min/week**
Low	No activity or some activity reported, but not enough to satisfy the requirements of the following activity categories.	<600
Moderate	Any of the following 3 criteria: • 3 or more days of vigorous-intensity activity for at least 20 minutes per day, • 5 or more days of moderate-intensity activity or waking for at least 30 minutes per day, or • 5 or more days of any combination of walking, moderate-intensity, or vigorous-intensity activities, achieving a minimum of 600 MET-minutes per week.	600–3000
High	Either of the following 2 criteria: • 3 or more days of vigorous-intensity activity, accumulating at least 1500 MET-minutes per week, or • 7 days of any combination of walking or moderate- or vigorous-intensity activities, achieving a minimum of 3000 MET-minutes per week.	≥3000

5.7 Data analysis

All statistical analyses were performed with the computer software IBM SPSS statistics version 25.0 and STATA version 15.0. Statistical significance was defined at the 0.05 level in all analyses.

Descriptive statistics

Descriptive statistics were performed to characterize the sample and to determine the levels of social capital, health-related quality of life, depressive symptoms, perceived stress, risky drinking, smoking, and physical activity in each country. Pearson's Chi-square tests were used to analyze the associations between depressive symptoms and sociodemographic characteristics, social capital, lifestyle-related variables, and perceived stress.

Multilevel analyses

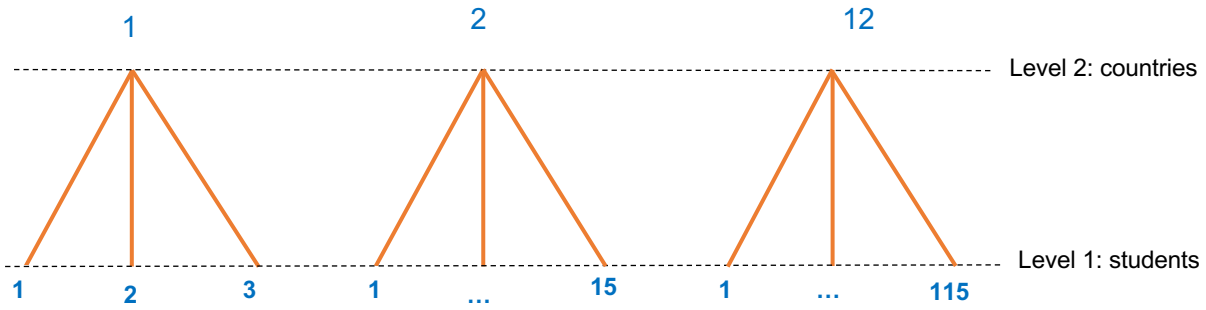
To test the association between university students' health and social capital, multilevel binary logistic regression analyses were performed. Multilevel models were chosen for the following reasons. First, the study includes data from university students living in 12 countries across the globe. Therefore, the data are clustered in these 12 countries. Second, individuals from the same country/university share the same context and are therefore influenced by the same measured and unmeasured factors. Thus, depressive symptoms vary from one country to another. The individuals in country A, for example, might tend to score higher on depressive symptoms than those in country B due to contextual factors. This could lead to ecological fallacy. If clustering was ignored, the standard errors of regression coefficients would be underestimated. The statistical model may look as follows:

$$y_{ij} = \beta_{00}+\beta_{01}W_j+\beta_{10}X_{ij}+\beta_{11}W_jX_{ij}+\mu_{0j}+\mu_{1j}X_{ij}+\varepsilon_{ij}$$

Where y_{ij} is the dependent variable, either depressive symptoms or suicidal ideation. The subscripts i and j reflect individual university students (at level 1) and countries (at level 2). βs represent the "fixed" parameters to be estimated; Xij reflects individual-level predictors (e.g., perceived stress); and Wj indicates country-level predictors (e.g., economic development). μ is the residual error term at the country level, and εij refers to the random component of the error

term. Figure 8 shows the conceptualized two-level structure with many level-1 units (e.g., university students) nested within fewer level-2 groups (e.g., countries). Below, the formalization of a multilevel model with two levels is presented. However, relations can easily be extended to the case of three or more levels.

Figure 8. Example of a two-level structure



For the analysis, the sample was divided into two groups according to the BDI-S scores: not clinically relevant depressive symptoms (<35) and clinically relevant depression (≥35). In line with previous research, dichotomous categories for depressive symptoms rather than a continuous scale were used. This reflects the use the use of BDI-S in clinical practice as a screening tool to identify those who deserve further investigation (Faller & Lang, 2010; Nollett et al., 2019).

Interclass Correlation Coefficient

To measure the proportion of variance in the outcome that is between Level-2 units (e.g., countries) the Interclass Correlation Coefficient (ICC) was calculated for each model. The ICC is a variance partition coefficient and provides estimates about the proportion of variance that is accounted for by the higher level (Merlo et al., 2005). A high ICC value shows the area levels are very important in understanding individual differences in health. An ICC closer to zero, on the other hand, suggests that area levels are similar and that they are not relevant to understanding differences in health (Merlo et al., 2005). It has been previously argued that the hierarchical data structure should not be ignored if the proportion of level-2 variance is 5% or more (Beilmann et al., 2018).

Country-level predictors

Level of economic development

Countries were grouped according to their level of economic development, representing the national income per person, or gross national income (GNI) per capita. Thus, countries were classified as one of four types: low-income economies, lower-middle-income economies, upper-middle-income economies, and high-income economies (Table 5).

Corruption Perceptions Index

In an additional analysis I looked at the degree of corruption in each country using the Corruption Perceptions Index (CPI) (Appendix E, Table 2A). The CPI is a composite index that assesses and compares perceived levels of public sector corruption in 180 countries. It uses a scale from 0 to 100, where 0 is highly corrupt and 100 is not corrupt (Transparency International, 2019). The vast majority of countries (Australia, Germany, Oman, Taiwan, South Korea, Switzerland, and the US) included in this study scored above 50. For the analysis, countries with scores below 50 were grouped into "more corrupt countries" (Albania, Brazil, Kosovo, and Malaysia), and those with scores above 50 were grouped into "less corrupt countries."

Table 5. Classification by income

Country	Income
Not present	Low-income economies
Kosovo	Lower-middle-income economies
Albania, Brazil, Malaysia	Upper-middle-income economies
Australia, Germany, Italy, Oman, Taiwan, South Korea, Switzerland and the USA	High-income economies

Sensitivity analysis

To test whether the results of the study are robust, two sensitivity analyses for depressive symptoms were conducted. First, to determine the influence of individual countries on the overall estimates a sensitivity analysis was conducted excluding countries with very high rates

of depressive symptoms (e.g., Brazil) and second linear regression using depressive symptoms as a continuous variable was performed.

5.8 Psychometric properties of measures

Prior to conducting the analysis, the reliability and validity of the measures were examined. Reliability was measured using internal consistency (Cronbach's alpha). This assessment uses a scale that yields a value between 0 and 1 for the test coefficient Cronbach's alpha (α). The higher the alpha value is, the higher the internal consistency of the measure. Although there is no standardized rule regarding acceptable values of α, an α of 0.70 is commonly regarded as the minimum acceptable value (Bland & Altman, 1997). In this study, a reliability test was conducted for the following five measures: depressive symptoms, perceived stress, Audit-C, cognitive social capital and behavioral social capital. In the present study, all the measures contain a sufficient amount of internal consistency, with α above 0.70. Table 6 shows Cronbach's alpha for each measure used.

Table 6. Psychometric properties of measures

Measure	Cronbach's alpha	Commonly accepted Cronbach's alpha*
Depressive symptoms	$\alpha = 0.91$	0.70
Perceived stress	$\alpha = 0.73$	
Audit-C	$\alpha = 0.82$	
Cognitive dimension of social capital	$\alpha = 0.71$	
Behavioral dimension of social capital	$\alpha = 0.72$	

*Note: *Bland & Altman (1997)*

5.9 Missing data

In the first wave of the SPLASH study, and in the present dissertation, missing data is not an immediate concern. The percentages of missing data are relatively low for all variables, ranging from 0% to 13%.

5.10 Chapter summary

This chapter has illustrated the methodology utilized to answer the research aims and hypotheses. A description of the SPLASH study, including participants, procedure of data collection and relevant setting was provided. The questionnaire variables used, and the psychometric properties were detailed. The statistical procedures, including the multilevel model, used to assess the research aims and hypothesis were described.

Chapter 6: Results

6.1 Introduction

This chapter describes the results of the study. It begins with the descriptive statistics for the general sample characteristics (e.g., demographic and socioeconomic characteristics), the main independent variable, social capital, followed by descriptive statistics for the main health outcome (depressive symptoms) and suicidal ideation. Then the results of the multilevel regression analyses for depressive symptoms and suicidal ideation are reported. The chapter finishes by reporting the results of a simple logistic regression analysis for self-rated heath.

6.2 Descriptive results

6.2.1 General sample characteristics

A total of 4,228 first-year students participated in the survey. Sociodemographic characteristics for all respondents are summarized in Table 7 and for respondents in each country in Table 8. The sample size differed by country, ranging from 142 in Kosovo to 708 in Germany. The total sample comprised students from **Albania** [University of Tirana (n = 258, 6.1%, mean age 18.91 ± 1.5 years)], **Australia** (n = 397, 9.4%, mean age 19.57 ± 2.5 years)], **Brazil** [University of Brasilia (n = 549, 13.0%, mean age 23.05 ± 3.5 years)], **Germany** [Bielefeld University (n = 708, 16.7%, mean age 19.92 ± 2.1 years)], **Italy** [Sapienza University of Rome (n = 402, 9.5 %, mean age 19.39 ± 1.4 years)], **Kosovo** [University for Business and Technology, (n = 142, 3.4%, mean age 19.10 ± 1.6 years)], **Malaysia** [Malaya University (n = 444, 10.5%, mean age 20.39 ± 1.5 years)], **Oman** [Sohar University (n = 278, 6.6%, mean age 19.94 ± 2.1 years)], **South Korea** [Chung-Ang University (n = 319, 7.5%, mean age 22.87 ± 1.7 years)], **Switzerland** [University of Zurich (n = 251, 5.9%, mean age 20.69 ± 7.9 years)], **Taiwan** [National Taiwan Normal University (n = 214, 5.1%, mean age 19.26 ± 1.4 years)], and the **USA** [Harvard University and Baylor University (n = 266, 6.3%, mean age 19.62 ± 8.1 years)].

Table 7. Sociodemographic characteristics for all participants (n = 4228)

	Total (n = 4228)
	N (%)
Gender (n = 7 (0.2%) missing)	
Male	1314 (31.1)
Female	2907 (68.9)
Mean age (± SD)	20.44 (3.73)
SES (n = 9 (0.2%) missing)	
Low/middle	2003 (47.5)
High	2216 (52.5)
Perceived level of income[a] (n = 262 (6.2%) missing)	
Agree	1825 (46.0)
Neither agree nor disagree	776 (19.6)
Disagree	1365 (34.4)
Living during term time (n = 226 (5.3%) missing)	
Parents' or relatives 'house	2400 (60.0)
College residence on/off campus	787 (19.7)
Rented house/flat	752 (18.8)
Other	63 (1.5)

More female than male students (68.9%) participated in the study, with more than two-thirds of participants in Albania being women, and just over a half in South Korea and Italy (Table 7 and Table 8). Regarding students' SES, the majority (52.6%) indicated having a higher SES. Higher levels of family SES were registered in Italy, South Korea, Switzerland, and the US. Lower levels of family SES were registered in Brazil, Kosovo, and Malaysia. More than two-fifth of students indicated that they had enough income to cover their monthly costs (Table 8). Missing data for each country is reported in the Appendix D (Table 1A and Table 1B).

Table 8. Sociodemographic characteristics by country

	ALB (n = 258) N (%)	AUS (n = 397) N (%)	BRA (n = 549) N (%)	GER (n = 708) N (%)	ITA (n = 402) N (%)	KOS (n = 142) N (%)
Gender						
Male	19 (7.4)	87 (31.3)	180 (32.8)	263 (37.4)	192 (47.8)	35 (24.6)
Female	239 (92.6)	309 (68.7)	369 (67.2)	440 (62.6)	210 (52.2)	107 (75.4)
Mean age (± SD)	18.91 (1.5)	19.57 (2.6)	23.05 (3.5)	19.93 (2.1)	19.40 (1.4)	19.10 (1.6)
SES						
Low/middle	112 (43.4)	177 (44.4)	458 (83.4)	263 (37.4)	115 (28.8)	84 (59.2)
High	146 (56.6)	222 (55.6)	91 (16.6)	441 (62.6)	285 (71.2)	58 (40.8)
Perceived level of income[a]						
Agree	80 (31.0)	196 (49.2)	2 (0.4)	470 (67.0)	253 (64.5)	72 (50.7)
Neither agree nor disagree	84 (32.6)	86 (21.6)	58 (10.6)	56 (8.0)	92 (23.5)	46 (32.4)
Disagree	94 (36.4)	116 (29.2)	489 (89.1)	175 (25.0)	47 (12.0)	24 (16.9)
Living during term time						
Parents' or relatives 'house	90 (34.9)	274 (68.7)	540 (100.0)	484 (68.9)	286 (72.2)	112 (78.9)
College residence on/off campus	29 (15.1)	15 (3.8)	0 (0.0)	32 (4.6)	12 (3.0)	2 (1.4)
Rented house/flat	123 (47.7)	89 (22.3)	0 (0.0)	181 (25.8)	92 (23.2)	26 (18.3)
Other	6 (2.3)	21 (5.2)	0 (0.0)	5 (0.7)	6 (1.6)	2 (1.4)

Note: ALB = Albania, AUS = Australia, BRA = Brazil, GER = Germany, ITA = Italy, KOS = Kosovo; [a]I have sufficient income to cover my monthly costs; missing data for each country is reported in Appendix D

Table 8 continued. Sociodemographic characteristics by country

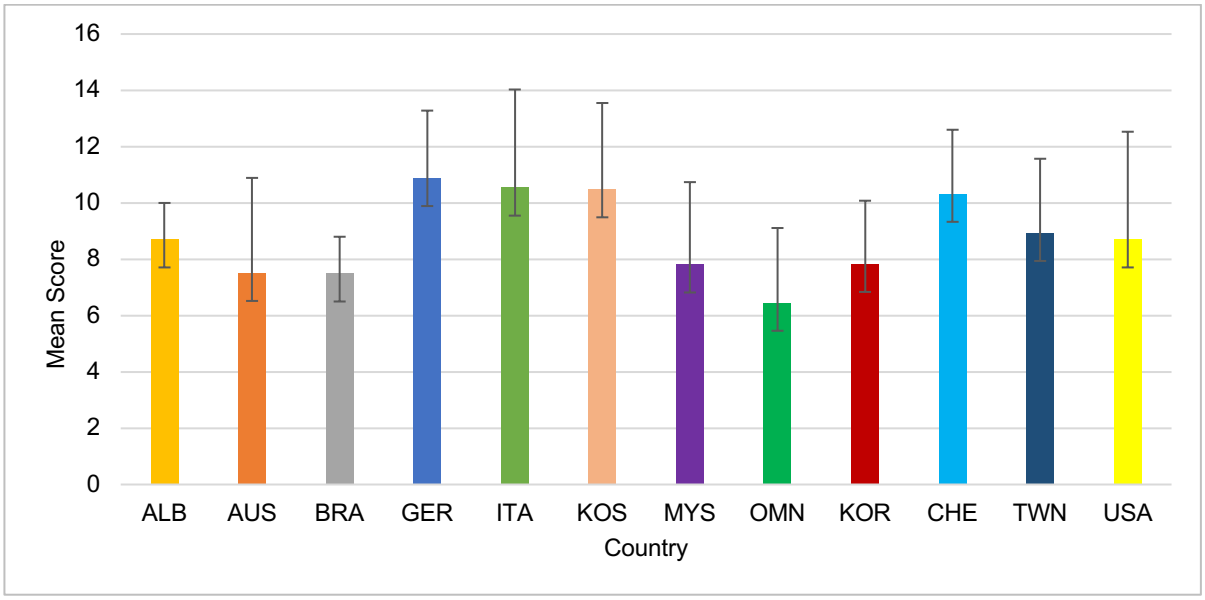
	MYS (n = 444) N (%)	OMN (n = 278) N (%)	KOR (n = 319) N (%)	CHE (n = 251) N (%)	TWN (n = 214) N (%)	USA (n = 266) N (%)
Gender						
Male	154 (34.7)	59 (21.2)	159 (49.8)	38. (15.1)	67 (31.3)	61 (23.0)
Female	290 (65.3)	291 (78.8)	160 (50.2)	213 (84.9)	147 (68.7)	219 (77.0)
Mean age (± SD)	20.40 (1.60)	19.95 (2.1)	22.87 (1.7)	20.69 (7.9)	19.27 (1.4)	19.62 (8.1)
SES						
Low/middle	232 (52.3)	212 (76.5)	76 (23.8)	61 (24.3)	171 (80.7)	43 (16.2)
High	213 (47.7)	65 (23.5)	243 (76.2)	190 (75.7)	41 (19.3)	223 (83.8)
Perceived level of income[a]						
Agree	169 (38.1)	127 (51.0)	89 (27.9)	198 (78.9)	NA	170 (63.9)
Neither agree nor disagree	163 (36.7)	51 (20.5)	87 (27.3)	12 (4.8)	NA	42 (15.8)
Disagree	112 (25.2)	71 (28.5)	143 (44.8)	41 (16.3)	NA	54 (20.3)
Living during term time						
Parents' or relatives' house	44 (9.9)	137 (49.3)	241 (75.5)	176 (70.1)	NA	8 (3.0)
College residence on/off campus	391 (87.9)	58 (20.9)	32 (10.0)	5 (2.0)	NA	202 (75.9)
Rented house/flat	8 (1.8)	62 (22.3)	46 (14.5)	70 (27.9)	NA	56 (21.1)
Other	2 (0.4)	21 (7.5)	0 (0.0)	0 (0.0)	NA	0 (0.0)

Note: MYS = Malaysia, OMN = Oman, KOR = South Korea, CHE = Switzerland, TWN = Taiwan, USA = Unites States of America; [a]I have sufficient income to cover my monthly costs; missing data for each country is reported in Appendix D

6.3 Social capital

Figure 9 shows the mean scores[4] for the behavioral social capital dimension. Students from Germany (M = 10.89, SD = 2.39) had the highest mean behavioral dimension of social capital score, followed by students from Italy (M = 10.55, SD = 3.84) and Kosovo (M = 10.48, SD = 3.06). In contrast, students from Oman had the lowest mean score (M = 6.46, SD = 2.65). Meaning that students from Oman were less likely to spend time with friends or to participate in community activities.

Figure 9. Mean behavioral social capital score by country

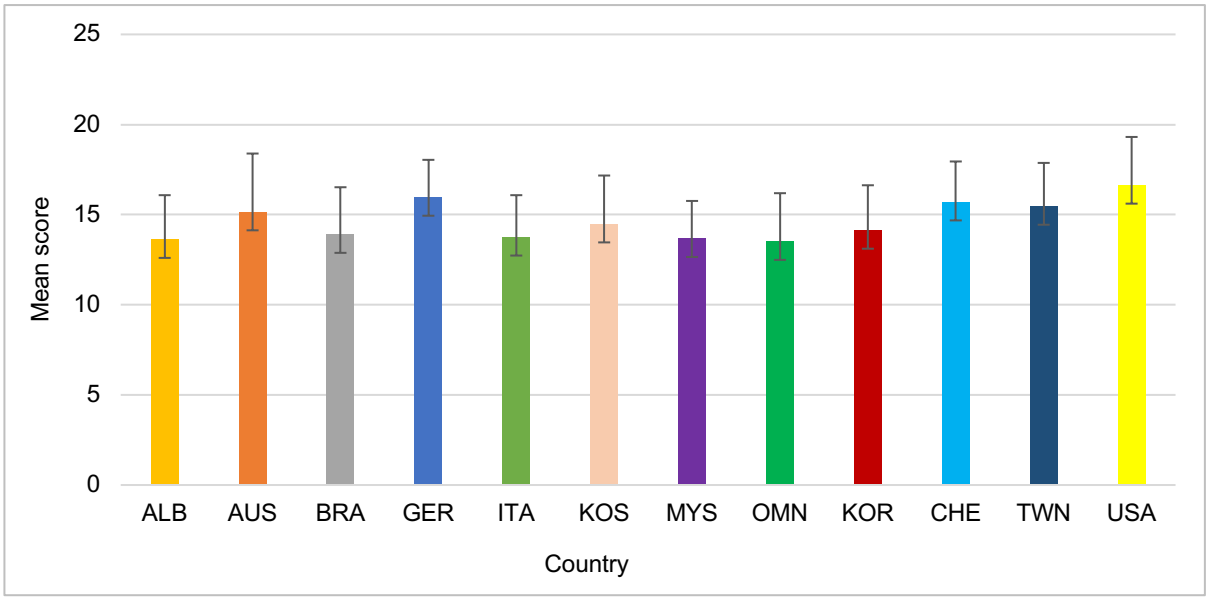


Note: ALB = Albania, AUS = Australia, BRA = Brazil, GER = Germany, ITA = Italy, KOS = Kosovo, MYS = Malaysia, OMN = Oman, KOR = South Korea, CHE = Switzerland, TWN = Taiwan, USA = Unites States of America; Differences were statistically significant, p<0.005

Figure 10 displays the mean scores for the cognitive social capital dimension. Students from Germany, Switzerland, and the US reached the highest mean score on this dimension, meaning that students from these countries were more likely to trust in one another or had someone to borrow money from. For example, students from the US had a mean of 16.61 (SD = 2.70), while again those from Oman had a mean of only 13.49 (SD = 2.70).

[4] In this part of the thesis, for the descriptive and comparative presentation of social capital mean values were used.

Figure 10. Mean cognitive social capital score by country



Note: ALB = Albania, AUS = Australia, BRA = Brazil, GER = Germany, ITA = Italy, KOS = Kosovo, MYS = Malaysia, OMN = Oman, KOR = South Korea, CHE = Switzerland, TWN = Taiwan, USA = Unites States of America; Differences were statistically significant, p<0.005

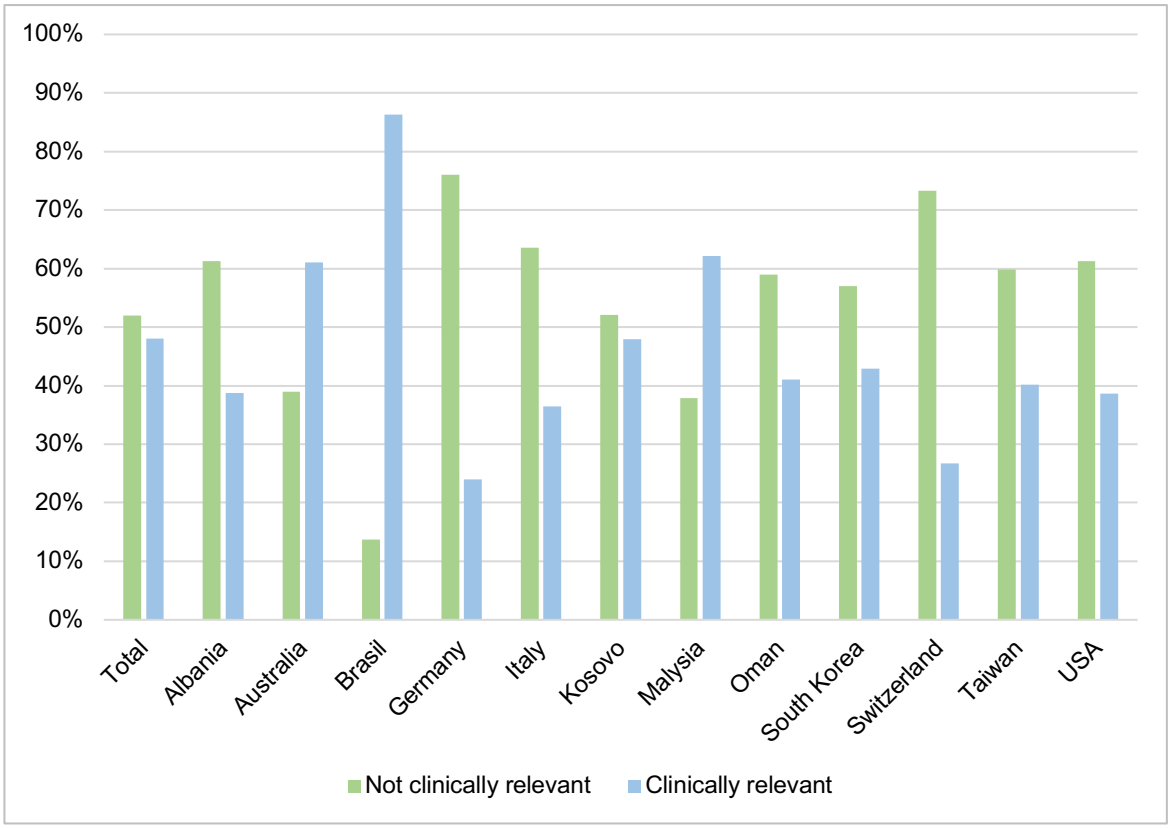
6.4 Psychological health

The following provides a description of the psychological health of university students. The first part reports the prevalence estimates of depressive symptoms and suicidal ideation, and the second parts reports risk factors associated with depressive symptoms and suicidal ideation.

6.4.1 Prevalence of depressive symptoms and suicidal ideation

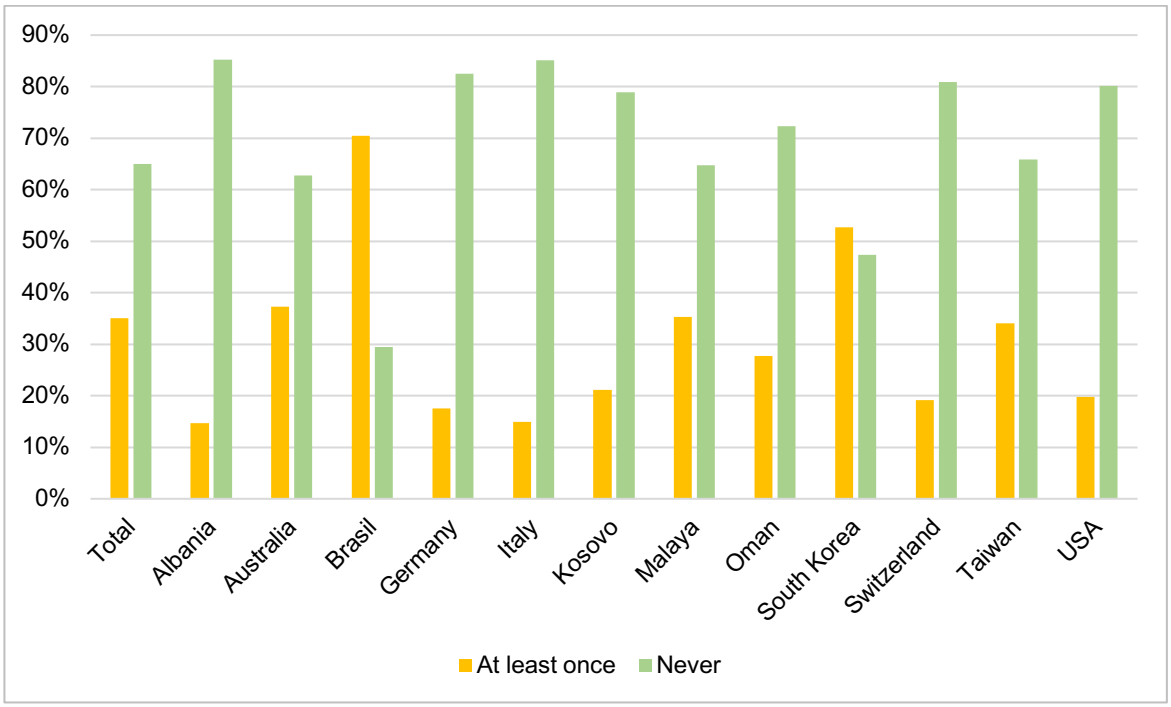
Overall, 48% of students scored positive on clinically relevant depressive symptoms (BDI-S ≥35) (Figure 11), and around 35% indicated having had suicidal thoughts at least once (Figure 10). The analyses also indicate significant discrepancies between countries ($p<0.005$). Prevalence estimates of clinically relevant depressive symptoms ranged from a high of 86% in Brazil to a low of 24% in Germany (Figure 11). Suicidal ideation was also highest in Brazil (71%), followed by South Korea (53%) (Figure 12). Italy (15%) and Albania (15%), in contrast, had the lowest rates of suicidal ideation, followed by Germany (18%) and Switzerland (19%).

Figure 11. Prevalence of depressive symptoms by country



Note: Differences were statistically significant, p<0.005

Figure 12. Suicidal ideation by country



Note: Differences were statistically significant, p<0.005

6.5 Factors associated with depressive symptoms

Table 9 shows the sociodemographic characteristics of university students with and without depressive symptoms and Table 10 shows health-related behavior characteristics of university students with and without depressive symptoms. A significantly higher proportion of students (57.9%) with clinically relevant depressive symptoms were from a family with lower SES ($p<0.001$) (Table 9). Being female and studying professions such as architecture was also significantly associated with clinically relevant depressive symptoms (Table 9). Furthermore, students living at their relatives' house showed a higher prevalence of depressive symptoms compared to students living in a rented flat or a college residence. As shown in Table 10, a significantly higher proportion of students with clinically relevant depressive symptoms reported having high levels of stress ($p<0.001$), perceived that their general health status was only fair/poor ($p<0.001$), and indicated having lower levels of social capital ($p<0.001$) compared to those without such symptoms.

Table 9. Sociodemographic characteristics of university students with and without depressive symptoms

	Total sample	Not clinically relevant N (%)	Clinically relevant N (%)	p-value
Total sample	**4228 (100.0)**	**2097 (52.0)**	**1938 (48.0)**	
Gender *(n = 196 (4.6%) missing)*				
Male	1279 (31.7)	718 (56.1)	561 (43.9)	<0.001
Female	2753 (68.3)	1377 (50.0)	1376 (50.0)	
Age *(n = 256 (6.1%) missing)*				
18 – 20 years	2491 (62.7)	1384 (55.6)	1107 (44.4)	<0.001
21 – 25 years	1210 (30.5)	593 (49.0)	617 (51.0)	
26 – 30 years	271 (6.8)	92 (33.9)	179 (66.1)	
Socioeconomic status *(n = 198 (4.7%) missing)*				
Low	1939 (48.1)	811 (41.8)	1128 (58.2)	<0.001
High	2091 (51.9)	1285 (61.5)	806 (38.5)	
Living during term time (n = 415 (9.8%) missing)				
Parents' house	1978 (51.9)	1033 (52.2)	945 (47.8)	<0.001
Relatives' house	315 (8.3)	62 (19.7)	253 (80.3)	
College residence	733 (19.2)	365 (49.8)	368 (50.2)	
Rented house/flat	728(19.1)	471 (64.7)	257 (35.3)	
Other	59 (1.5)	34 (57.6)	25 (42.4)	
Academic discipline (n = 566 (13.4%) missing)				
Natural sciences	359 (9.8)	204 (56.8)	155 (43.2)	<0.001
Social sciences	954 (26.0)	543 (56.9)	411 (43.1)	
Humanities	497 (13.6)	282 (56.7)	215 (43.3)	
Applied sciences: medicine and healthcare professions	461 (12.6)	199 (43.2)	262 (56.8)	
Applied sciences: engineering and technology	328(9.0)	174 (53.0)	154 (47.0)	
Business and economics	726 (19.8)	431 (59.4)	295 (40.6)	
Other studies (e.g., architecture)	237 (6.5)	59 (24.9)	178 (75.1)	
Formal sciences	100 (2.7)	37 (37.0)	63 (63.0)	

Table 10. Health-related behavior among university students with and without depressive symptoms

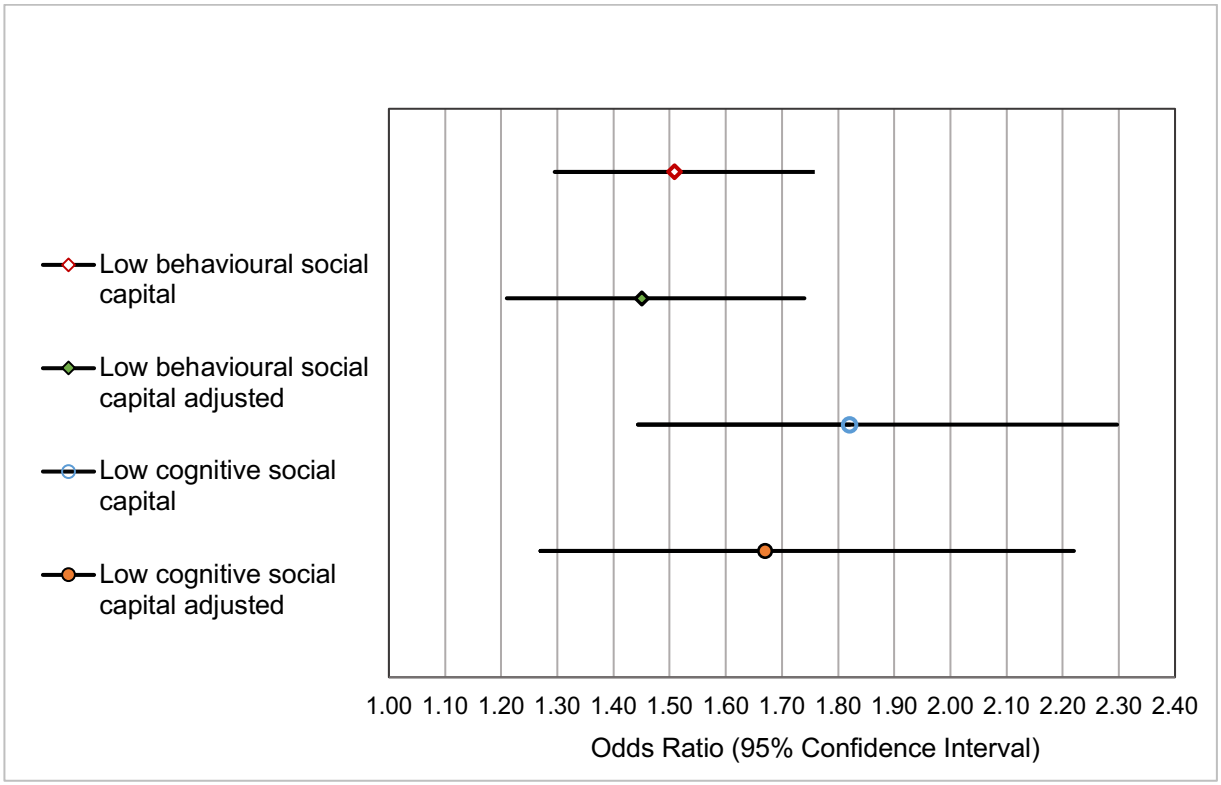
	Total sample	Not clinically relevant N (%)	Clinically relevant N (%)	p-value
Physical activity (n = 454 (10.7%) missing)				
Low	1059 (28.1)	535 (50.5)	524 (49.5)	<0.001
Moderate	1832 (48.5)	822 (44.9)	1010 (55.1)	
High	883 (23.4)	597 (67.6)	286 (32.4)	
Alcohol consumption* (n = 309 (7.9%) missing)				
Non-hazardous drinking	2376 (66.0)	1146 (48.2)	1230 (51.8)	<0.001
Hazardous drinking	1226 (34.0)	694 (56.6)	532 (43.4)	
Suicidal ideation (n = 161 (3.8%) missing)				
Never	2612 (64.8)	1871 (71.6)	741 (28.4)	<0.001
At least once	1420 (35.2)	224 (15.8)	1196 (84.2)	
Self-rated health (n = 204 (4.8%) missing)				
Good	3264 (81.1)	1796 (55.0)	1468 (45.0)	<0.001
Fair/poor	760 (18.9)	294 (38.7)	466 (61.3)	
Smoking status (n = 348 (8.2%) missing)				
Non-smoker	1214 (31.3)	531 (43.7)	683 (56.3)	<0.001
Ever smoker	2666 (68.7)	1472 (55.2)	1194 (44.8)	
Perceived stress (n = 199 (4.7%) missing)				
Low	733 (18.2)	690 (94.1)	43 (5.9)	<0.001
Moderate	2946 (73.1)	1360 (46.2)	1586 (53.8)	
High	350 (8.7)	42 (12.0)	308 (88.0)	
Social capital: behavioral dimension (n = 195 (4.6%) missing)				
Low	2486 (61.6)	1073 (43.2)	1413 (56.8)	<0.001
High	1547 (38.4)	1022 (66.1)	525 (33.9)	
Social capital: cognitive dimension (n = 194 (4.6%) missing)				
Low	444 (11.0)	153 (34.5)	291 (65.5)	<0.001
High	3590 (89.0)	1943 (54.1)	1647 (45.9)	

*Note: *Oman (n=278) was excluded*

6.6 Risk factors for depressive symptoms

The results of the multilevel logistic analyses are shown in Table 11. After controlling for potential confounding factors (age, gender, and SES) (Model 1), low levels of both cognitive (OR: 1.82, 95%CI: 1.44 – 2.29) and behavioral social capital (OR: 1.51, 95%CI: 1.29 – 1.76) were significantly associated with clinically relevant depressive symptoms (Model 1). The unadjusted and adjusted analysis yielded approximately the same magnitude of effects, suggesting that age, sex, and SES may not be major confounding factors in the association between social capital and depressive symptoms (Figure 13).

Figure 13. Crude OR and age, sex, and SES-adjusted OR and 95% CIs for reporting clinically relevant depressive symptoms by social capital



The odds of reporting clinically relevant depressive symptoms were significantly higher among students with high perceived stress (OR: 17.57, 95%CI: 11.33 – 27.26) than among those with lower perceived stress. Furthermore, there is evidence that vigorous physical activity was inversely associated with depressive symptoms, as higher levels of physical activity per week were associated with a 38% decrease in the likelihood of reporting depressive symptoms (OR: 0.62, 95%CI: 0.49 – 0.78) (Table 11).

When accounting for country-level characteristics/contextual factors, the analyses showed that students living in lower to upper-middle-income economy countries (e.g., Albania, Brazil, Kosovo, Malaysia) had higher odds (OR: 3.47, 95%CI: 1.43 – 8.42) of reporting clinically relevant depressive symptoms, as did students living in more corrupt countries (OR: 3.22, 95%CI: 1.21 – 8.58). In an additional analysis, not presented in this thesis, when aggregating responses regarding trust (proportion of students agreeing that people can be trusted), students living in countries with low levels of trust were found to have a significantly higher risk of depressiveness (OR: 2.87, 95%CI: 1.09 – 7.58). Low trust countries included Albania, Australia, Brazil, Italy, Kosovo, and Malaysia. In addition, living in a country with low levels of cognitive social capital was also correlated with depressiveness ($r = 0.25$, $p<0.005$) (Figure 14).

Figure 14. Relationship between low cognitive social capital and clinically relevant depressive symptoms

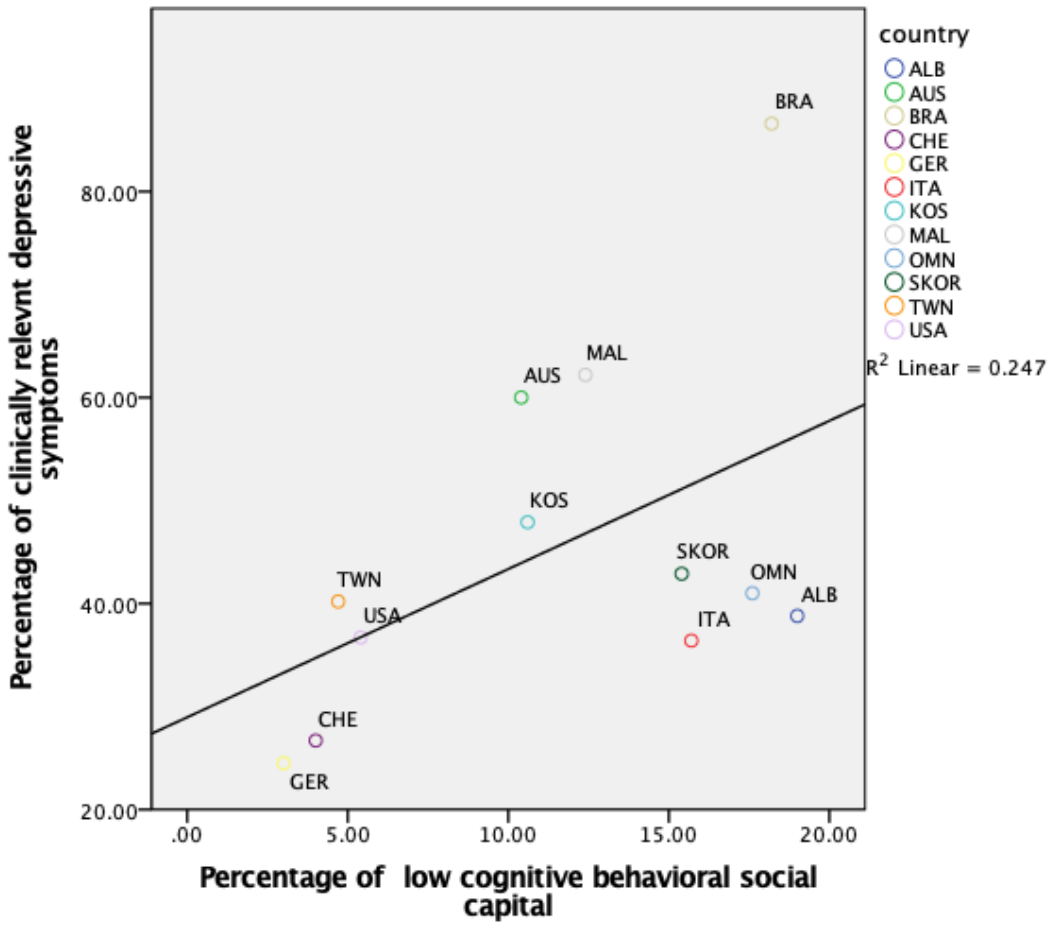


Table 11. Results of the multilevel models, displaying adjusted odds ratios* (OR) (95% CI) for social capital and depressive symptoms

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
Social capital behavioral dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**1.51 (1.29 - 1.76)**	**1.45 (1.21 - 1.74)**	**1.48 (1.23 - 1.77)**
Social capital cognitive dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**1.82 (1.44 - 2.29)**	**1.67 (1.27 - 2.22)**	**1.65 (1.25 - 2.20)**
Gender			
Male (ref)	1.00	1.00	1.00
Female	**1.36 (1.16 - 1.60)**	1.09 (0.90 - 1.32)	1.10 (0.91 - 1.33)
Age	1.00 (1.00 - 1.00)	1.00 (1.00 - 1.00)	1.00 (1.00 - 1.00)
Socioeconomic status			
High (ref)	1.00	1.00	1.00
Low	1.45 (1.24 - 1.70)	1.32 (1.11 - 1.58)	1.33 (1.11 - 1.58)
Self-rated health			
Good (ref)		1.00	1.00
Fair/poor		**2.50 (1.94 - 3.22)**	**2.49 (1.93 - 3.21)**
Perceived stress			
Low stress (ref)		1.00	1.00
High stress		**17.57 (11.33 - 27.26)**	**17.65 (11.38 - 27.39)**
Smoking status			
Non-smoker (ref)		1.00	1.00
Ever smoker		1.06 (0.81 - 1.38)	1.06 (0.82 - 1.39)
Alcohol consumption			
Non-hazardous (ref)		1.00	1.00
Hazardous		0.99 (0.75 - 1.13)	0.99 (0.80 - 1.24)
Physical activity			
Low (ref)		1.00	1.00
Moderate		0.92 (0.75 - 1.13)	0.92 (0.75 - 1.13)
Vigorous		**0.62 (0.49 - 0.78)**	**0.62 (0.49 - 0.79)**
Country-level characteristics/contextual factors			
Level of economic development			
High-income economy (ref)			1.00
Lower- to upper-middle-income economy			**3.47 (1.43- 8.42)**
ICC	0.19 (0.09 - 0.36)	0.22 (0.11 - 0.41)	0.17 (0.08 - 0.33)

Without including any individual-level variables, 19% of the variance in individual depressive symptoms came from the country level (ICC, Table 11, and Model 1). After adding individual-level characteristics, the variance increased to 22% (ICC, Table 11, and Model 2). Interestingly, when excluding countries with high rates of clinically relevant depressive symptoms, the ICC decreased to 10%, suggesting that the level of depression is more affected by individual differences than by country-level differences.

Stratified analysis by sex

Given possible gender differences in depressiveness and in relation to social capital, analytical models were stratified by sex. Table 12 presents the gender-stratified associations between different social capital and clinically relevant depressive symptoms. Behavioral and cognitive social capital seemed to be equally important for both female and male students, as the results showed similar magnitudes (Model 2: low behavioral social capital, female: OR 1.41, 95%CI: 1.18 – 1.78; low behavioral social capital, male: OR 1.45, 95%CI: 1.04 – 2.02). In both groups, lower levels of social capital were associated with greater risk of clinically relevant depressive symptoms. For female students, vigorous physical activity was significantly inversely associated with clinically relevant depressive symptoms (OR: 0.55, 95%CI: 0.41 – 0.74), while for males this was not significant (OR: 0.69, 95%CI: 0.45 – 1.06) (Table 12). A detailed sex-stratified analysis including all three models can be found in Appendix E (Table 2B).

Table 12. Sex-stratified analysis between different social capital and clinically relevant depressive symptoms

	Female		Male	
	Model 1	**Model 2**	**Model 1**	**Model 2**
	OR (95% CI)	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Social capital behavioral dimension				
High social capital (ref)	*1.00*	*1.00*	*1.00*	*1.00*
Low social capital	1.42	1.41	1.61	1.45
	(1.14 - 1.65)	**(1.18 - 1.78)**	**(1.21 - 2.16)**	**(1.04 - 2.02**)
Social capital cognitive dimension				
High social capital (ref)	*1.00*	*1.00*	*1.00*	*1.00*
Low social capital	1.66	1.56	2.15	1.94
	(1.24 - 2.22)	**(1.09 - 2.21)**	**(1.45 - 3.18)**	**(1.21 - 3.09)**
Age	1.00	1.00	1.02	1.03
	(0.97 - 1.02)	(0.97 - 1.03)	(0.97 - 1.03)	(0.96 - 1.11)
Socioeconomic status				
High (ref)	*1.00*	*1.00*	*1.00*	*1.00*
Low	1.37	1.24	1.66	1.45
	(1.14 - 1.64)	**(1.00 - 1.53)**	**(1.25 - 2.19)**	**(1.04 - 2.00)**
Self-rated health				
Good (ref)		*1.00*		*1.00*
Fair/poor		2.66		1.99
		(1.92 - 3.69)		**(1.29 - 3.07)**
Perceived stress				
Low stress (ref)		*1.00*		*1.00*
High stress		14.83		50.64
		(9.19 - 13.94)		**(11.98 - 14.06)**
Smoking status				
Non-smoker (ref)		*1.00*		*1.00*
Ever smoker		1.51		0.55
		(1.06 -2.15)		(0.37 - 0.84)
Alcohol consumption				
Non-hazardous (ref)		*1.00*		*1.00*
Hazardous		1.03		0.97
		(0.77 - 1.40)		(0.67 - 1.39)
Physical activity				
Low (ref)		*1.00*		*1.00*
Moderate		0.90		1.00
		(0.70 - 1.15)		(0.67 - 1.50)
High		0.55		0.69
		(0.41 - 0.74)		(0.45 - 1.06)

6.6.1 Sensitivity analysis

Two sensitivity analyses were conducted. First, a multilevel logistic regression analysis was performed, excluding countries with very high rates of depression (e.g., Brazil). Second, to test whether results differed from the logistic regression, a hierarchical linear regression using depressive symptoms as a continuous scale was conducted. Similar to the multilevel logistic regression, in both sensitivity analyses variables were distributed between three models. The first model included sociodemographic variables (age, gender, family SES), the second model contained individual-level variables, and the third model included a country-level predictor.

Sensitivity tests revealed that excluding countries with very high prevalence estimates did not substantially change the central findings. Students with lower levels of cognitive social capital (OR: 1.90, 95%CI: 1.47 – 2.46) and behavioral social capital (OR: 1.38, 95%CI: 1.16 – 1.63) were still significantly more likely to report clinically relevant depressive symptoms (Table 13). Furthermore, when conducting the analyses using depressive symptoms on a continuous scale, coefficients were in the same direction (Table 14). In line with the logistic regression, the association between both cognitive and behavioral social capital and depressiveness was significant ($p<0.001$). Moving on to the individual-level variables introduced in Model 2, positive relationships were found between depressiveness and fair/poor self-rated health ($\beta= 6.89$, $p<0.001$) and ever smokers ($\beta= 1.76$, $p<0.044$). This indicates that students with poorer health and those who indicated having smoked at least once reported more symptoms of depression on average. In Model 3, when country-level characteristics were added, the coefficients for both cognitive and behavioral social capital stayed virtually unchanged. Similar to the logistic regression, the linear regression established that the level of economic development of a country could statistically significantly predict depressiveness ($\beta= 5.98$, $p<0.003$). In addition, there was a significant inverse association ($\beta= -2.68$, $p<0.002$) between depressiveness and physical activity, indicating that students with higher levels of physical activity were less depressed.

Table 13. Sensitivity analysis excluding countries with very high rates of depressive symptoms

	MODEL 1 OR (95% CI)	MODEL 2 OR (95% CI)	MODEL 3 OR (95% CI)
Social capital behavioral dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**1.38 (1.16 - 1.63)**	**1.32 (1.08 - 1.61)**	**1.33 (1.09 - 1.62)**
Social capital cognitive dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**1.90 (1.47 - 2.46)**	**1.87 (1.36 - 2.58)**	**1.87 (1.36 - 2.58)**
Gender			
Male (ref)	1.00	1.00	
Female	**1.42 (1.19 - 1.71)**	1.34 (0.92 - 1.42)	1.14 (0.91 - 1.42)
Other than male or female	1.72 (0.86 - 3.43)	1.60 (0.75 - 3.40)	1.59 (0.77 - 3.28)
Age	1.00 (0.98 - 1.02)	1.00 (0.98 - 1.04)	1.00 (0.98 - 1.04)
Socioeconomic status			
High (ref)	1.00	1.00	1.00
Low	**1.49 (1.26 - 1.76)**	**1.36 (1.11 - 1.65)**	**1.34 (1.10 - 1.64)**
Self-rated health			
Good (ref)		1.00	1.00
Fair/poor		**2.51 (1.91 - 3.29)**	**2.52 (1.92 - 3.30)**
Perceived stress			
Low stress (ref)		1.00	1.00
High stress		**18.21 (11.51 - 28.81)**	**18.28 (11.55 - 28.92)**
Smoking status			
Non-smoker (ref)		1.00	1.00
Ever smoker		1.21 (0.92 - 1.61)	1.24 (0.94 - 1.64)
Alcohol consumption			
Non-hazardous (ref)		1.00	1.00
Hazardous		1.09 (0.86 -1.38)	1.10 (0.87 - 1.40)
Physical activity			
Low (ref)		1.00	1.00
Moderate		0.89 (0.71 - 1.13)	0.90 (0.71 - 1.14)
High		**0.58 (0.43 - 0.74)**	**0.56 (0.43 - 0.74)**
Country-level characteristics			
High-income economies (ref)			1.00
Upper-middle-income economies			1.13 (0.58 - 2.22)
Lower-middle-income economies			2.10 (0.83 - 5.32)
ICC	0.05 (0.02 - 0.12)	0.06 (0.02 - 0.16)	0.04 (0.01 - 0.13)

Table 14. Linear regression analysis for variables predicting depressive symptoms

	Model 1			Model 2			Model 3		
	β	*SE*	*p-value*	*β*	*SE*	*p-value*	*β*	*SE*	*p-value*
Low social capital cognitive dimension	5.90	0.97	<0.001	4.36	0.98	<0.001	4.31	0.98	<0.001
Low social capital behavioral dimension	4.12	0.68	<0.001	3.30	0.67	<0.001	3.28	0.67	<0.001
High perceived stress				23.22	1.13	<0.001	23.29	1.13	<0.001
Fair/poor self-rated health				6.89	0.86	<0.001	6.86	0.86	<0.001
Ever smoker				1.76	0.87	0.044	1.84	0.86	0.033
Hazardous alcohol consumption				1.54	0.75	0.041	-1.49	0.75	0.046
Physical activity									
Moderate				-1.13	0.78	0.146	-1.10	0.78	0.159
High				-2.68	0.88	0.002	-2.63	0.88	0.003
Country level									
Level of economic development									
Lower- to upper-middle-income economies							5.98	2.00	0.003
ICC (95% CI)	0.05 (0.02 - 0.10)			0.05 (0.02 - 0.12)			0.02 (0.11 - 0.07)		

6.7 Factors associated with suicidal ideation

Table 15 presents the associations of the socioeconomic, demographic, and academic variables with the presence of suicidal ideation. University students from families with a lower SES presented a significantly (p<0.001) higher prevalence of suicidal ideation compared to those from families with a higher SES.

Table 15. Sociodemographic characteristics of university students with and without suicidal ideation

	Never N (%)	At least once N (%)	p-value
Total sample	**2644 (65.0)**	**1423 (35.0)**	
Gender			
Male	804 (62.6)	480 (37.4)	0.030
Female	1838 (66.1)	942 (33.9)	
Age *(n = 93 (2.2%) missing)*			
18 – 20 years	1813 (72.1)	702 (27.9)	<0.001
21 – 25 years	683 (56.1)	535 (43.9)	
26 – 30 years	105 (38.7)	166 (61.3)	
Socioeconomic status			
Low	1097 (56.3)	852 (43.7)	<0.001
High	1544 (73.1)	569 (26.9)	
Living during term time			
Parents' house	1277 (63.7)	729 (36.3)	<0.001
Relatives' house	86 (27.3)	229 (72.7)	
College residence	522 (71.2)	211 (28.8)	
Rented house/flat	564 (77.0)	168 (23.0)	
Other	47 (79.7)	12 (20.3)	
Academic discipline			
Natural sciences	253 (70.1)	108 (29.9)	<0.001
Social sciences	658 (68.6)	301 (31.4)	
Humanities	357 (69.9)	154 (30.1)	
Applied sciences: medicine and healthcare professions	262 (56.8)	199 (43.2)	
Applied sciences: engineering and technology	178 (53.5)	155 (46.5)	
Business and economics	553 (75.8)	177 (24.2)	
Other studies (e.g., architecture)	84 (35.4)	153 (64.6)	
Formal sciences	61 (60.4)	40 (39.6)	
Physical activity			
Low	706 (66.3)	359 (33.7)	
Moderate	1040 (56.5)	802 (43.5)	
High	702 (78.3)	195 (21.7)	<0.001
Smoking status			
Non-smoker	691 (56.9)	524 (43.1)	
Ever smoker	1830 (67.9)	866 (32.1)	<0.001
Hazardous alcohol consumption			
Non-hazardous drinking	1563 (65.0)	842 (35.0)	
Hazardous drinking	759 (61.8)	470 (38.2)	0.055

6.8 Risk factors for suicidal ideation

The adjusted ORs for variables associated with suicidal ideation are presented in Table 16. The background variables age and gender were not significantly related to suicidal ideation with the exception of family SES (OR: 1.36, 95%CI: 1.06 – 1.49), but only in Model 1. Even after adjusting for further individual-level predictors, low levels of both social capital dimensions were positively associated with suicidal ideation (Model 2). Smoking cigarettes (OR: 1.41, 95%CI: 1.06 – 1.88), hazardous drinking (OR: 1.43, 95%CI: 1.14 – 1.78) and high levels of perceived stress (OR: 3.59, 95%CI: 2.70 – 4.77) were significantly associated with suicidal ideation in the fully adjusted models. Surprisingly, unlike depressive symptoms, no associations were found for country-level characteristics. Neither the level of economic development of a country nor its level of corruption (Appendix E, Table 2C) seemed to influence students' risk for suicidal ideation.

It is important to note, that although the here observed variables are not the only factor associated with suicidal ideation, these findings underscore the importance of examining social factors in addition to health risk behaviors.

Table 16. Results of multilevel models, displaying adjusted odds ratios* (OR) (95% CI) for social capital and suicidal ideation

	MODEL 1	MODEL 2	MODEL 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Social capital behavioral dimension			
High social capital (ref)	*1.00*	*1.00*	*1.00*
Low social capital	**1.33 (1.12 - 1.58)**	**1.24 (1.03 - 1.51)**	**1.24 (1.02 - 1.50)**
Social capital cognitive dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**1.93 (1.52 - 2.46)**	**1.84 (1.39 - 2.43)**	**1.83 (1.38 - 2.41)**
Gender			
Male (ref)	*1.00*	*1.00*	*1.00*
Female	0.92 (0.78 - 1.09)	0.84 (0.70 - 1.02)	0.84 (0.70 - 1.02)
Age	1.00 (0.98 - 1.03)	1.01 (0.98 - 1.03)	1.01 (0.98 - 1.04)
Socioeconomic status			
High (ref)	*1.00*	*1.00*	*1.00*
Low	**1.26 (1.06 - 1.49)**	1.17 (0.97 - 1.40)	1.68 (0.96 - 1.40)
Self-rated health			
Good (ref)		*1.00*	*1.00*
Fair/poor		**1.76 (1.39 - 2.22)**	**1.76 (1.39 - 2.22)**
Perceived stress			
Low stress (ref)		*1.00*	*1.00*
High stress		**3.59 (2.70 - 4.77)**	**3.60 (2.71 - 4.79)**
Smoking status			
Non-smoker (ref)		*1.00*	*1.00*
Ever smoker		**1.41 (1.06 - 1.89)**	**1.41 (1.06 - 1.88)**
Alcohol consumption			
Non-hazardous (ref)		*1.00*	*1.00*
Hazardous		**1.41 (1.14 - 1.78)**	**1.43 (1.14 - 1.78)**
Physical activity			
Low (ref)		*1.00*	*1.00*
Moderate		0.84 (0.68 - 1.05)	0.85 (0.68 - 1.05)
High		**0.64 (0.50 - 0.82)**	**0.64 (0.50 - 0.82)**
Country-level characteristics			
Level of economic development			
High-income economies (ref)			*1.00*
Upper-middle-income economies			2.41 (0.69 - 8.94)
Level of corruption			
Less corrupt (ref)			
More corrupt			
ICC	0.23 (0.12 - 0.41)	0.26 (0.13 - 0.45)	0.23 (0.11 - 0.42)

6.9 Self-rated health

The outcome variable of self-rated health was assessed using item 1 from the Optum SF-12v2 questionnaire: "How would you rate your health status?'' There were five possible answers on a Likert scale: (1) very poor, (2) poor, (3) fair, (4) good, and (5) excellent. For the analysis, the answers were dichotomized, with "Fair" and "Poor" represented as "Fair/poor," and "Good," "Very good," and "Excellent" as "Good" self-rated health.

Table 17 presents the associations between the main independent variables (social capital), the control variables, and self-rated health. About 11% of the surveyed students rated their health as excellent, 34.5% reported it to be very good, 36% as good, 14% as fair, and 4.6% as poor (Table 17). There were differences between countries, with the best health ratings in Kosovo (70% rating their health as very good or excellent), followed by the US (60.8%) and Italy (60.8%). Regarding positive feelings, 40% of students felt peaceful and calm (Figure 15); over a quarter of the students in Albania (26.4%) and more than half of those in Germany (62%) and Taiwan (66%) indicated that they felt calm and peaceful most of the time (Figure 16). In contrast, South Korea had the lowest proportion of students reporting these feelings (20.4%) (Figure 16).

Figure 15. Percentage of students who felt peaceful and calm

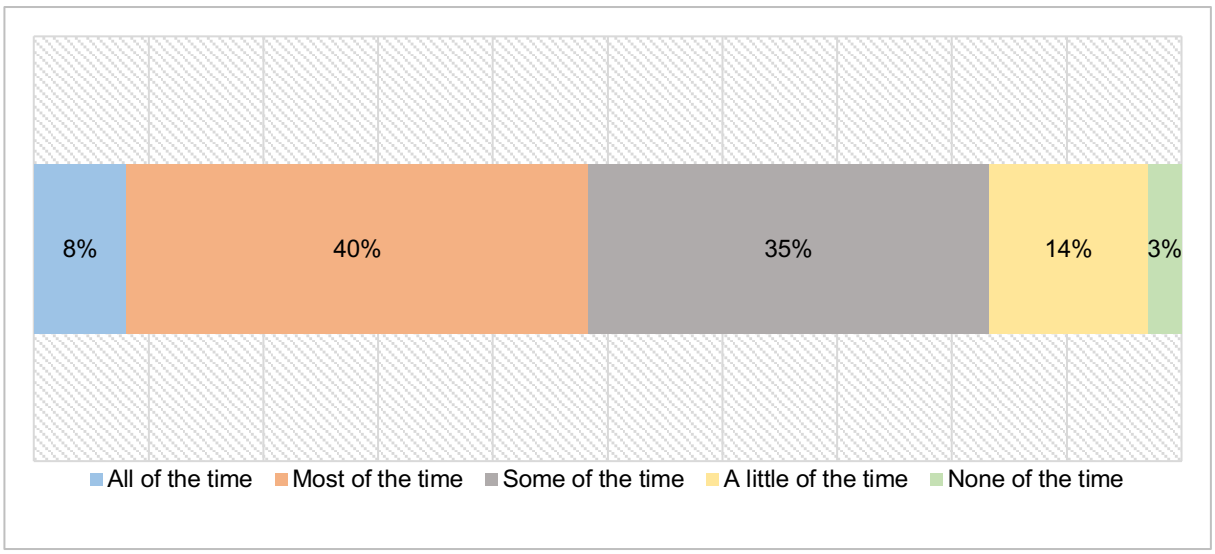
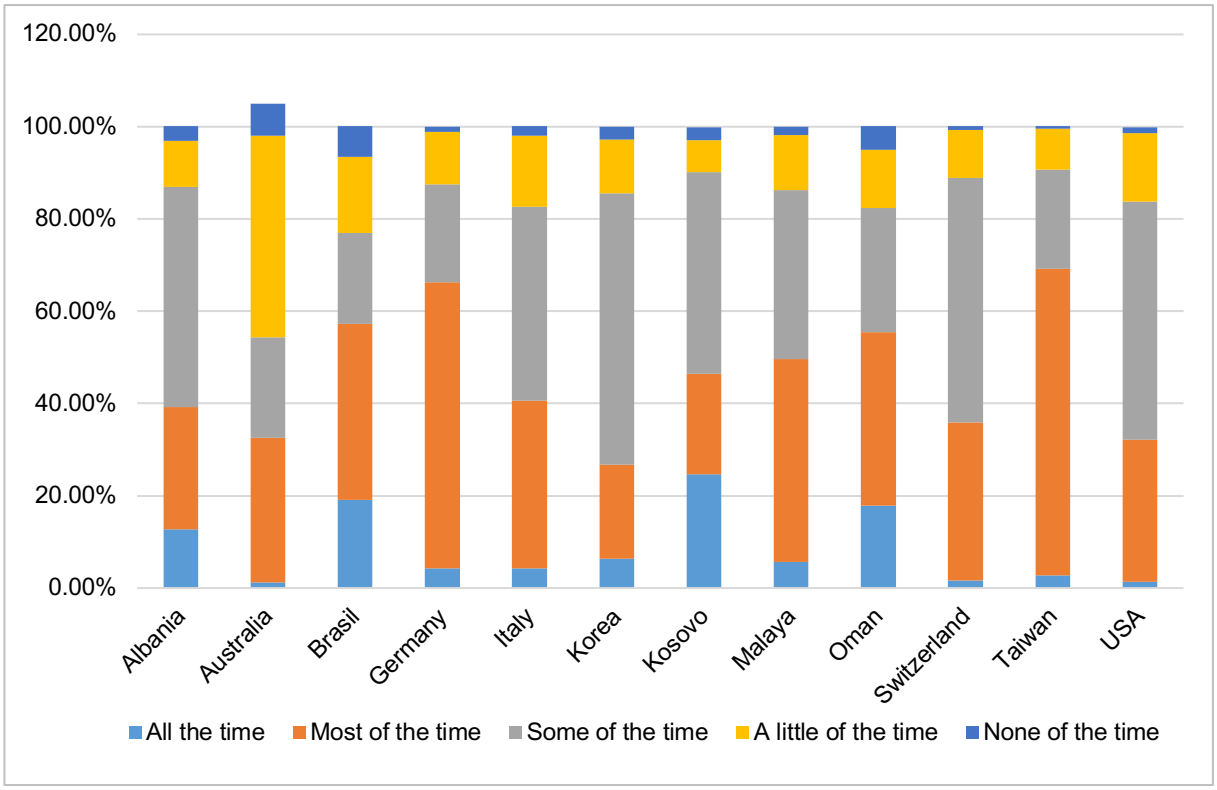


Table 17. Sociodemographic characteristics of university students

	Total sample N (%)	Female N (%)	Male N (%)	p-value
Self-rated health				
Excellent	448 (10.9)	269 (9.5)	178 (13.7)	
Very good	1421 (34.5)	983 (33.8)	438 (33.8)	
Good	1583 (36.0)	1047 (37.1)	436 (33.6)	
Fair	579 (14.1)	388 (13.7)	191 (14.7)	
Poor	189 (4.6)	136 (4.8)	53 (4.1)	<0.001
Depressive symptoms				
Not clinically relevant	2095 (52.0)	1377 (50.0)	718 (56.1)	
Clinically relevant	1937 (48.0)	1376 (50.0)	561 (43.9)	<0.001
Suicidal ideation				
Never	2642 (65.0)	1838 (66.1)	804 (62.6)	
At least once	1422 (35.0)	942 (33.9)	480 (37.4)	0.030
Age				
18 – 20 years	2631 (63.7)	1873 (66.0)	758 (56.6)	
21 – 25 years	1224 (29.6)	795 (28.0)	429 (33.2)	
26 – 30 years	278 (6.7)	172 (6.0)	106 (8.2)	<0.001
Socioeconomic status				
Low	2003 (47.5)	1429 (49.2)	574 (43.8)	
High	2213 (52.5)	1475 (50.8)	738 (56.2)	<0.001
Physical activity				
Low	1067 (28.0)	802 (30.8)	265 (22.0)	
Moderate	1843 (48.4)	1280 (49.1)	563 (46.8)	
High	898 (23.6)	523 (20.1)	375 (31.2)	<0.001
Alcohol consumption				
Non-hazardous drinking	*2410 (66.2)*	1707 (65.5)	703 (59.5)	
Hazardous drinking	*1229 (33.8)*	750 (34.5)	479 (40.5)	<0.001
Smoking status				
Non-smoker	1219 (31.1)	871 (32.5)	348 (28.0)	
Ever smoker	2699 (68.9)	1805 (67.5)	894 (72.0)	0.004
Perceived stress				
Low	748 (18.3)	445 (15.9)	303 (23.6)	
Moderate	2981 (73.0)	2075 (74.1)	906 (70.5)	
High	357 (8.7)	280 (10.0)	77 (6.0)	<0.001
Social capital behavioral dimension				
Low	2627 (62.3)	1808 (62.2)	819 (62.3)	
High	1529 (37.7)	1097 (37.8)	495 (37.7)	0.955
Social capital cognitive dimension				
Low	474 (11.3)	303 (10.5)	171 (13.1)	
High	370 (88.7)	2574 (89.5)	1135 (86.9)	0.015

Figure 16. Percentage of students who felt peaceful and calm by country



Regarding the energy dimension, 49.6% of students in Germany and 59.3% of students in Taiwan felt that they had high energy most of the time. Again, in comparison, only 17.2% of South Korean students felt this way. Table 17 also shows that a significantly higher proportion of students with depressive symptoms perceived their general health status as poor ($p<0.001$).

6.10 Factors associated with fair/poor self-rated health

In the analysis using self-rated health as the dependent variable, the ICC was below 5%. This indicates that for fair/poor self-rated health the area-level (level 2 units) does not play a significant role. Therefore, a simple binary logistic regression analysis has been performed (please refer to p.49 'Interclass Correlation Coefficient' for further explanation).

Fair/poor self-rated health was associated with low levels of both cognitive social capital (OR: 1. 29, 95%CI: 1.02 – 1.63) and behavioral social capital (OR: 2.01, 95%CI: 1.67 – 2.42) (Table 18, Model 1). Furthermore, fair/poor self-rated health was associated with higher levels of perceived stress (OR: 1.86, 95%CI: 1.37 – 2.52), clinically relevant depressive symptoms (OR: 2.12, 95%CI: 1.70 – 2.64), and hazardous alcohol consumption (OR: 1.45, 95%CI: 1.17 – 1.79) (Table 18, Model 2). Students who spent more days doing moderate-to-vigorous physical activity were less likely to report fair/poor health (OR: 0.71, 95%CI: 0.53 – 0.95) (Table 18, Model 2), but this association was only statistically significant in Model 2. Fair/poor self-rated health was also more prevalent in countries with a higher GNI (Table 18, Model 3). Thus, countries with greater income inequality had poorer health.

Table 18. Odds ratios for fair/poor self-rated health

	MODEL 1	MODEL 2	MODEL 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Social capital behavioral dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**2.01 (1.67 - 2.42)**	**1.58 (1.26 - 1.97)**	**1.43 (1.14 - 1.80)**
Social capital cognitive dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**1.29 (1.02 - 1.63)**	**1.38 (1.05 - 1.80)**	**1.33 (1.02 - 1.75)**
Gender			
Male (ref)	1.00	1.00	1.00
Female	0.97 (0.82 - 1.16)	0.83 (0.68 - 1.01)	0.83 (0.68 - 1.02)
Age	1.02 (0.99 - 1.05)	1.03 (0.99 - 1.06)	1.01 (0.97 - 1.04)
Socioeconomic status			
High (ref)	1.00	1.00	1.00
Low	**1.82 (1.54 - 2.14)**	**1.36 (1.11 - 1.66)**	**1.36 (1.11 - 1.67)**
Depressive symptoms			
Not clinically relevant (ref)		1.00	1.00
Clinically relevant		**2.12 (1.70 - 2.64)**	**1.99 (1.59 - 2.49)**
Perceived stress			
Low stress (ref)		1.00	1.00
High stress		**1.86 (1.37 - 2.52)**	**2.05 (1.49 - 2.81)**
Smoking status			
Non-smoker (ref)		1.00	1.00
Ever smoker		**0.78 (0.63 - 0.96)**	**0.76 (0.61 - 0.94)**
Alcohol consumption			
Non-hazardous (ref)		1.00	1.00
Hazardous		**1.45 (1.17 - 1.79)**	**1.46 (1.18 - 1.80)**
Physical activity			
Low (ref)		1.00	1.00
Moderate		0.86 (0.68 - 1.08)	0.84 (0.67 - 1.07)
High		**0.71 (0.53 - 0.95)**	0.74 (0.55 - 1.00)
Country-level characteristics			
Level of economic development			
High-income (ref)			1.00
Lower- to upper-middle-income economy			**1.25 (1.01 - 1.58)**

6.11 Chapter summary

This study showed significant associations between clinically relevant depressive symptoms, suicidal ideation, self-rated health, and both dimensions of social capital. Furthermore, the results revealed great inequalities among students. Specifically, students with a low family SES had greater odds of reporting clinically relevant depressive symptoms, a greater risk for suicidal ideation, and poorer self-rated health. Furthermore, for clinically relevant depressive symptoms, the context in which students lived seemed to play an important role. Living in a low- to upper-middle-income country and in a more corrupt country more than doubled the risk for clinically relevant depressive symptoms. In contrast, vigorous physical activity seemed to significantly decrease the likelihood of such symptoms, suicidal ideation, and poor self-rated health.

Chapter 7: Discussion

7.1 Introduction

This chapter discusses and interprets the findings of the study. The particular focus of discussion is on the main health outcome, depressive symptoms, and on the micro- and macro-level aspects of social capital. Later, the study's strengths and limitations are considered. In the final section, some implications for future research and health promotion strategies are presented.

7.2 Discussion

Overall summary

The present study investigated the prevalence of depressive symptoms, suicidal ideation, and poor self-rated health. Furthermore, it tested whether there was an association between these three variables and social capital. Overall, the prevalence of clinically relevant depressive symptoms and suicidal ideation was high. Around 48% of students had clinically relevant depressive symptoms (BDI-S≥35), with considerably high rates in samples from Brazil (86%) and Malaysia (62%), and 35% of students indicated having had suicidal thoughts at least once. Around one-fifth of the students declared having average or fair/poor health.

7.2.1 Depressive symptoms and suicidal ideation

The present study found a prevalence of 48% for clinically relevant depressive symptoms and 35% for suicidal ideation (i.e., having had suicidal thoughts at least once). The overall prevalence of depressive symptoms in this study is somewhat consistent with the rates previously reported among university students (Auerbach et al., 2018; Ibrahim, Kelly, Adams, et al., 2013). Ibrahim et al. (2013) found that depression was prevalent in one-third of students, with rates varying between 10 and 85%. In the present study, the prevalence of depressiveness differed substantially between countries, from a low of 24% in Germany to a high of 86% in Brazil. Similarly, in an international college student project, Auerbach et al. (2018) found varying lifetime prevalence estimates, from a low of 19.1% in Belgium to a high of 48.3% in Australia.

The results of the multilevel logistic regression analyses indicated that even when controlling for individual- and country-level characteristics, both lower levels of cognitive and behavioral social capital were associated with depressive symptoms among university students. A similar pattern was found for suicidal ideation: the regression analysis showed that students with low cognitive and behavioral social capital were more likely to have suicidal thoughts. The sociodemographic variables had no effect on depressive symptoms, with the exception of family SES. Students from low SES families were at greater risk of clinically relevant depressive symptoms and suicidal thoughts.

When accounting for country-level characteristics, students from lower- to upper-middle-income economy countries (e.g., Kosovo, Albania, Brazil, and Malaysia) in particular had higher odds of reporting clinically relevant depressive symptoms. However, I cannot exclude that these results were confounded by other characteristics of the countries. For example, the sample in the present study included three troubled countries in this stratum (Brazil, Malaysia, and Albania). These countries have had massive civil unrest (e.g., Brazil) and/or a history of corruption and ethnic division (e.g., Malaysia, Albania). Therefore, the effects of a dire political situation probably influenced the results. This particular phenomenon is discussed in more detail later in this chapter (see p. 84-86 for a detailed discussion on period effects in Brazil).

Lifestyle-related variables, including frequency of alcohol consumption, smoking, and physical activity, were also significantly associated with depressive symptoms and suicidal ideation, which is consistent with previous studies (Buckner et al., 2007; Pedrelli et al., 2016). Both Buckner et al. (2007) and Pedrelli et al. (2016), found that problematic substance use is associated with depression. A growing body of evidence also points to the positive relationship between physical activity and improved cognitive functioning and academic achievement (Chaddock et al., 2012). The benefits of physical activity on the brain are not limited to improved cognition: it is also well established that engaging in physical activity significantly reduces depression and anxiety symptoms among non-clinical adult populations (Rebar et al., 2015). Regarding suicidal ideation in particular, this study showed that physically active students, specifically those who practiced vigorous physical activity, were 36% less likely to indicate having had suicidal thoughts compared to their inactive counterparts.

Similarly, Taliaferro (2009) found that male and female college students who engaged in some physical activity demonstrated less hopelessness and suicidal ideation compared to physically inactive students. As such, encouraging first-year university students to maintain healthy lifestyle behaviors would likely reduce the risk of depression and suicide.

In general, it is important to note that students are more susceptible to mental health issues than the general population. This is due to the following: First, university students are in the phase of emerging adulthood, which represents a distinct period of development. These years are marked by profound life changes, including the obtainment of the level of education and training that will provide the foundation for their professional achievement and income later in life. Second, students experience increased autonomy from their parents. Many students move away from home and lose direct access to their usual key support systems (Arnett, 2000). Third, many have not yet developed stable (romantic) relationships (Arnett, 2000). These years are often characterized by instability, with shifts between life choices concerning work and love, and moving from one home to another. Not seldom, young people ask themselves, "What kind of person am I?", "What do I want to do later in life?", and "What kind of person should I find as a partner through life?" (Fincham & Cui, 2010).

While these factors may also lead to an increased risk of suicide, it is important to note that suicidality among university students is highly complex. Academic, familial, and interpersonal stressors as well as sexual orientation have been named the most common risk factors for suicide-related behaviors among this population (De Luca et al., 2016).

Micro-level aspects of social capital

This study found various significant relationships at the individual/micro-level of social capital. Students with low individual perceptions of their social capital were at greater risk of clinically relevant depressive symptoms. These findings are not new in social capital and health research, but support prior studies that have shown significant effects of individual-level social capital on mental health and self-rated health in adults and adolescents (Borges et al., 2010; Cohen-Cline et al., 2018; Haseda et al., 2018; Novak et al., 2018). Cohen-Cline et al. (2018), for instance, found that cognitive social capital was associated with fewer depressive

symptoms in adult twins (Cohen-Cline et al., 2018). Similar results were obtained in a study from Brazil: both the cognitive and behavioral dimensions of social capital and bridging social capitals were protective of adolescents' health (Borges et al., 2010). However, the present study contributes to previous findings by having a different focus group, namely university students. To the best of my knowledge, no other studies have assessed the effects of social capital on depressive symptomatology among university students.

Macro-level aspects of social capital and period effects in Brazil

While this study found relevant micro-level aspects of social capital (e.g., students with low individual perceptions of social capital are at greater risk of depression), important macro-level findings were also obtained. First, the study found extraordinarily high levels of depression in general, but also impressive between-country variation. Students living in lower- to upper-middle-income countries and those living in more corrupt countries were more likely to present clinically relevant depressive symptoms. Interestingly, countries where students had the lowest levels of social capital also showed the highest levels of clinically relevant depressive symptoms. An additional examination revealed that the tendency to report distrust was highest among students in Albania, Brazil, and Malaysia, and lowest in Germany and Switzerland. One could speculate about the reasons for these international differences, but they are likely to be the product of particular political, historical, social and cultural factors. The countries with the most distrust seemed to be ones with high levels of corruption, ethnic conflict, political repression, and/or political instability.

I will try to explain this using the case of Brazil: First, participating students were from the university in Brasilia. Brasilia is the federal capital of Brazil and the political hub of the country, which is experiencing great economic and political difficulties. Since 2014, the country has been in a period of economic recession, ideological polarization, loss of purchasing power, and cuts in public investments. Brazil is currently the ninth economy in the world, but its gross domestic product (GDP) dropped from U$2.6 trillion in 2011 to U$1.8 trillion in 2018 (World Bank, 2019). The gross national income per capita had an unprecedented increase from U$2,890 to U$12,810 over one decade (2003-13), but similar to the GDP, it dropped by 28.6% after this glorious decade.

Second, in addition to cuts in social spending that have already occurred, debates on welfare and labor reforms are ongoing, and important political changes have been discussed regarding the funding of healthcare, science and education (Doniec et al., 2018; Sims, 2019). The underinvestment in public services has caused frustration and anger among Brazilians (The Fund for Peace, 2019). Here it is important to note that approximately 87.9% of the 2,448 existing Brazilian higher education institutions are private and that the majority of students enrolled in programs at private universities belong to low-income families; also the present study was conducted in a private institution (Ministério da Educação, 2018). The changes in social programs made by the government have significantly affected Brazil's University for All Program (ProUni) and FIES, a government guaranteed loan with a social goal of expanding the access to higher education to approximately 1 million young adults. By 2016, for example, around 5,000 fewer contracts were made by FIES than in 2014, and in 2018, only half of enunciated government loans were made available for students (Ministério da Educação, 2019). At the University of Brasilia, around 70% of students receive scholarships and/or depend on FIES. Previous studies have demonstrated that financial difficulties can have a strong and independent effect on mental health (Economou et al., 2013). For instance, during the Greek economic crisis, research found that variations in GDP per capita and unemployment were highly correlated with the use of antidepressants and benzodiazepines[5], showing that unemployment, job and economic insecurity, and higher debt among the population can cause or aggravate mental health problems (Thomaidis et al., 2016).

In addition to economic hardship and political upheaval, Brazil is facing a serious problem with corruption. In the short timeframe of five years, perplexed Brazilians have witnessed the corruption at a state-owned oil company and seen former president Ms. Rousseff impeached, followed by several cases of corruption associated with Mr. Temer (at that time vice-president). Historically, left parties are known for their discourse against corruption with politicians associated with large corporations. When these parties are caught in corruption scandals, the impact tends to be greater, as it is associated with a social feeling of betrayal (Grigera et al., 2019). In this vein, previous studies have found that corruption is related to lower life satisfaction and poorer mental health (Tavits, 2008; van Deurzen, 2017).

[5] Drugs primarily used for treating anxiety.

Brazil is in second place in terms of lowest generalized trust among seven other Latin American countries (Vincens et al., 2018). Brazil also continues to worsen on the Fragile States Index (FSI), a ranking of 178 countries, across indicators such as cohesion and political development, with 2019 marking the country's sharpest year-on-year decline (The Fund for Peace, 2019).

Similar contextual factors can be found in Albania, Kosovo, and Malaysia. Kosovo, as a developing country, and Albania, as one of the poorest countries in Europe, are characterized by high rates of unemployment, poverty, social exclusion, and gender disparities (World Bank, 2018). In Malaysia, ethnic inequality and income seem to persist, although the country's Gini coefficient[6] has dropped considerably in recent years. These factors all represent main causes of mental health issues (Marmot, 2014). Perhaps students' stress is aggravated by financial difficulties, uncertainties about the future of benefits provided by the government, as well as corruption scandals and low trust. Students' level of mental health might reflect broader social and political problems in society. While we tend to think of college students as being a cosseted and privileged group in society due to their age and social standing, the findings suggest that they can also be "canaries in the coalmine" (tr. "canarini nelle miniere di carbone"). Therefore, a policy prescription would not only be to improve individuals' social capital, but also to focus on the wider social and political context of a country when analyzing students' health.

Very few studies have directly investigated whether cross-national differences in mental health can be explained by cross-national variations in social capital. The strongest evidence for social capital having an impact on health, at the macro-level, probably comes from Kawachi (1997 & 1999) and Helliwell (2004). Kawachi (1997 & 1999) discovered that US states with higher levels of social mistrust also had higher levels of all age-adjusted total mortality and higher rates of fair/poor health (Kawachi et al., 1997, 1999). Helliwell (2004) observed a close relationship between social capital and suicide rates: he found that social capital explained more than half of the substantial variation in national suicide rates (Helliwell, 2004).

[6] A statistical measure of distribution developed Corrado Gini in 1912. It is used to gauge economic inequality and measures income distribution or, less commonly, wealth distribution among a population.

7.2.2 Self-rated health

Around 18% of the students in this study indicated having average or fair/poor health. Lower levels of social capital were significantly associated with fair/poor self-rated health, also after accounting for SES, gender, and age. However, additional adjustment for individual and country characteristics resulted in a decrease in the associations. Overall, these findings converge with those of a previous study on social capital and self-rated health (Borges et al., 2010; Novak et al., 2017).

Interestingly, an inverse association was found between smoking and poor/fair self-rated health. Students who indicated ever having smoked as well as those who were current smokers (results not presented) were less likely to rate their health as poor or fair. This contradicts most research on university students (Mikolajczyk et al., 2008; Rohrer et al., 2012). Rohrer, Cole, and Schulze (2012) found that cigarette smoking was associated with lower odds of having good self-rated health. It is possible that in the present sample, smoking served as a coping strategy to relieve stress (Park et al., 2015). A second possibility is that students were social smokers. This is in fact highly common among university students (Moran et al., 2004). Research has established that the frequency and intensity of tobacco use among social smokers is much lower than that of regular smokers (Moran et al., 2004). Both frequency and intensity are known to play a significant role in health. Unfortunately, the present study did not assess whether the students were social smokers.

7.3 Theoretical explanations

At least two theoretical explanations may account for the findings regarding associations between depressiveness and social capital at the individual level: the stress buffering model and the main effect model (Fujiwara & Kawachi, 2008; Kawachi & Berkman, 2001). The stress buffering model hypothesizes that social capital can provide opportunities for (psycho)social support that, if accessed, will tend to decrease stress, acting as a "buffering factor." On the other hand, the main effect model proposes that living in a highly trusting environment can have a protective effect against mental illness (Fujiwara & Kawachi, 2008; Kawachi et al., 2008; Kawachi & Berkman, 2001). However, the models are not mutually exclusive. Instead, they might help to explain the influence of specific aspects of social capital. Specifically, individuals

living in a trusting environment may experience a higher sense of security and belonging. Students who live in a highly trusting community or attend a more supportive university could find it easier to obtain social support to cope with daily difficulties (i.e., stress buffering model). The structural elements of social relationships, such as social integration, might operate via the main effects model, whereas functional aspects of social capital, such as perceived support, may act through a stress buffering mechanism (Kawachi & Berkman, 2001).

In contrast, the underlying pathways at the macro-level of social capital are thought to be different. First, it is possible that countries with high levels of social capital have better health because they have better public services (Halpern, 2005). Several researchers have put forward that there is a strong mutual/reciprocal relationship between state-level social capital and government performance (Halpern, 2005). Furthermore, higher social trust has been associated with lower rates of government corruption and better infrastructure (La Porta et al., 1997). Hendryx and colleagues (2002), for example, demonstrated that individuals in areas with high levels of social capital reported better access to healthcare (Hendryx et al., 2002). A second possibility is that the effect might relate to shared mutual norms and values. It is possible that in high-trust countries, people are nicer to and more supportive of one another, and that life in general is less conflictual. The third possibility concerns income inequality. For example, Kawachi (1997) noted a strong correlation between income inequality and both per capita group membership ($r = -0.46$) and lack of social trust ($r = 0.76$). Less affluent individuals may be less likely to subscribe to social groups, such as sports clubs. Therefore, it is possible that increased income inequality reduces social capital, subsequently resulting in poorer health.

It is important to note that social capital does not parenthetically develop in communities (Murayama et al., 2012). It is more likely that it is shaped by broader structural forces operating at the community level. These can include a country's historical pattern of corruption and transparency in decision-making – in short, state capability and credibility (Meier, 2002).

7.4 Another possible factor influencing students' health

It cannot be excluded that other factors play a role in depressiveness in university students. A cause that has recently emerged is social media use. Over the past decade, there has been a dramatic increase in Internet and social media use (Statista, 2019). Although this can be traced to all levels of society, it is more frequently observed among the younger generation. In a US survey of those 18 to 29 years of age, 88% indicated using social media, whereas that share fell to 78% among those aged 30 to 49, and to only 37% among those aged 65 and older (Perrin & Anderson, 2019).

The development of modern communication technologies, their increasing roles in social life, and their excessive use represent a threat to social life and the building of (offline) social capital. The ease of Internet access, in particular, has made it one of the most popular mediums for communication and information seeking (Ramamohanarao, Gupta, Peng, & Leckie, 2007). Moreover, applications such as Snapchat and Instagram could be particularly problematic for mental health, because they often concern physical appearance.

However, opinions on whether Internet and social media use have a deleterious effect on social relationships and health are divided, and some argue that they may have a beneficial effect instead (Kraut et al., 1998; Shaw & Gant, 2002). For instance, the augmentation hypothesis states that Internet use adds to existing face-to-face friendships and can improve the giving and receiving of social support (which can result in better health). The displacement hypothesis, on the other hand, posits that Internet use displaces face-to-face friendships and reduces the quality of social support received and given, thereby lowering health (Glaser, Liu, Hakim, Vilar, & Zhang, 2018). In an early study from 1998, Kraut et al. (1998) discovered that a greater use of the Internet was associated with a reduction of a participants' size of social circle and an increase in depression. In contrast, Shaw and Gant (2002) reported that Internet use significantly increased perceived social support and self-esteem and decreased loneliness and depression.

The links between Internet and social media use and university students' health have not yet been adequately examined. Nevertheless, insights gleaned from research indicate a variety of

directions in which it may affect health. A possibility is that idle pursuits on the Internet increase stress (Garett et al., 2017). Perceived stress has been noted, including in this study, to negatively influence health. Kross and colleagues (2013) investigated how Facebook usage influenced subjective well-being over time (Kross et al., 2013); they found that it predicted negative shifts in how people felt from moment to moment as well as how satisfied they were with their lives. On the contrary, face-to-face contact with people did not yield these negative outcomes. Similarly, Rosen et al. (2013) tested the link between the use of specific technologies or media (e.g., Facebook use) and mental health. Analyzing data from around 1,140 teenagers, young adults, and adults, the researchers found that mental health disorders were predicted by the use of one or more Facebook functions (e.g., photo management) (Rosen et al., 2013).

Although only a few studies to date have examined the impact of social media use on health, it is not farfetched to assume that it does play an important role in students' health, particularly because we do know that the rates of mental health issues among students have increased significantly over the last decade, and that this happened almost simultaneously with the increased use of the Internet and social media. I am not against the Internet and social media. In fact, I find them very useful to stay in touch with friends and family, but I do think it would be worth it, to critically investigate their impact on health - in the near future.

7.5 Methodological considerations

7.5.1 Strengths

The here presented study fills a gap in the current literature by offering not only new insights into students' health, but also data on social capital. Furthermore, the international multicenter study design enabled the comparison of countries around the world. Unlike other social capital and health studies, the present work also included a wide range of data on health behaviors, such as smoking and physical activity, which are the factors that are most probable to correlate with self-rated and psychological health and access to social capital (Eriksson et al., 2010).

7.5.2 Limitations

The present study has limitations that should be considered when interpreting and generalizing the results. These limitations primarily concern the sample, measurements, and study design.

Setting and sample

The current sample and setting present some potential limitations. The study was conducted in 12 countries across the globe. However, only one university per country was represented, except in the US, where it was possible to sample students from two universities. Therefore, the sample may not be wholly representative of the entire student population in each country. Nonetheless, the overall sample size is relatively large with more than 4,000 students, exceeding the sample size of 3,508 students required to provide sufficient power. This sample is also larger than in most other recent epidemiological studies investigating students' health (Barker et al., 2018; Ngin et al., 2018). Furthermore, the sample is sufficiently diverse to allow the results to be generalized. Nevertheless, it would be beneficial to replicate the study in more universities in each country.

Study design

The first wave of the SPLASH study followed a cross-sectional approach, thus precluding any inferences regarding causality or directionality of the effects of social capital on health. Therefore, reverse causality cannot be excluded. Social capital may influence health and vice versa. A lower stock of social capital may generate reduced levels of health, but individuals with poor health may also generate lower or moderate levels of social capital. Specifically, the possibility that depressive symptoms lead to, for example, lower perceptions of trust and belonging, or that individuals with better mental health are more likely to be socially active cannot be excluded. Therefore, a longitudinal follow-up study investigating the association between social capital and depressive symptoms is needed. While it is not possible to establish a causal link between health and social capital at this point in time, results of available longitudinal studies are promising and do support a causal relation between social capital and psychological health (Fiorillo et al., 2017; Wilmot & Dauner, 2019).

Research instruments

While previously validated and reliable measures were used, the data in this study were obtained through self-reported questionnaires. Hence, self-reporting bias for both mental health and social capital cannot be excluded. We cannot exclude over- or underreporting, which may have inflated or deflated the associations between social capital and depressiveness. In addition, retrospective self-report assessments are prone to recall biases, errors, and distortions that may emerge from the characteristics of one's memory (Stone & Shiffman, 2002). Social desirability bias also contributes to the potential limitations of self-report assessment methods (Fisher et al., 2015; McGrath et al., 2010). Furthermore, the primary measure of suicidal ideation was item 9 of the BDI-S. Although this item has been shown to be a reliable tool to assess suicidal ideation, the use of a clinician report and assessment as well as semi-structured interviews would have been preferable, as studies have shown that they can improve the accuracy of the classification of suicide risk (Hom et al., 2016; Yigletu et al., 2004). Moreover, in general, the BDI-S remains a depression screening tool, not a diagnostic tool.

Control variables

Although we adjusted for a large number of factors, some variables that could contribute to depressiveness were not assessed, such as loss of a close family member or family history of depression.

Challenges in assessing social capital

The measurement of social capital is continuously evolving. Despite years of theoretical development and empirical research, a gold standard is lacking (Villalonga-Olives et al., 2016). Furthermore, to consider social capital at the collective/macro-level, individual responses were aggregated in this study. Although this is commonly done within the collective approach, it may not sufficiently represent macro-level social capital. In particular, aggregating the responses assumes that social capital at the collective level is equal to the aggregated individual-level social capital, but it is probable that collective social capital is more than the sum of individual attributes (Nyqvist, 2009; Portes, 1996).

7.6 Implications and suggestions for health promotion

The findings of this study have several implications, although the exact mechanisms driving the gradient in social capital and depressive symptoms in university students are yet to be determined. First, targeting young people remains fundamental because poor health can seriously affect students' education, which is an essential determinant of health. Higher educational attainment in particular has been associated with better social and economic development (e.g., higher income) and with an increase in one's capacity for better decision-making regarding health (Marmot, 2017). Second, given that social capital may have positive effects on students' mental health, universities should consider implementing and strengthening interventions focusing on enhancing social capital. This could involve, for example, promoting social and sports clubs. These initiatives could also help to reduce social isolation. Another possibility is for universities to initiate campaigns encouraging students to refrain from engaging in time-out on phones, and instead engage in time-in with conversations with friends and classmates. Furthermore, universities might consider introducing teaching methods such as problem-based learning, which offers a different way of learning than traditional university education does. In problem-based learning, students meet in small tutorial groups to collaboratively work through course material under the supervision of a mentor. This can increase student engagement and networking and ultimately improve students' access to social networks. Third, given the high rates of depressive symptoms, there is a need for on-campus mental health counselling services. It is also advised that such services include the concept of social capital as an add-on component in mental health interventions. These may include interventions focusing on social participation, interventions engaging students to enhance the diversity of their network as well as to make new social connections with people beyond their usual network.

7.6.1 Suggestions for future research

To the best of my knowledge, this study is the first to explore the effect of social capital on mental health outcomes among university students from different countries. Bearing in mind the limitations discussed above, further research is needed to confirm the results. In particular, as mentioned, a longitudinal study is needed. In fact, this is planned for a forthcoming study,

and a second wave of the project started in the summer/fall of 2019. In the first wave, students were asked to create a personal identification number and to provide their email address. This has made it possible to follow up with students and to compare data from waves 1 and 2. A longitudinal design is helpful to evaluate the effects of social capital on depressive symptoms more robustly. Specifically, it can help to elucidate the mechanisms that connect social capital and depressive symptoms and to establish causality.

Furthermore, granting that mental health varies across demographics, relatively little is known about how it differs with respect to (social) factors that are more specifically related to the younger generation. This includes, for example, Internet and social media use and addiction. Although social media use can be traced to all levels of society, it is more frequently observed among the younger generation (Duggan & Brenner, 2013).

With regard to social capital in particular, the development of modern communication technologies and their increasing roles in social life can present a threat to social life and the building of (offline) social capital. As previously mentioned, there is ongoing debate on whether Internet and social media use contributes to more and better social relationships or has negative health outcomes, such as increased depression. Moreover, studies exploring how social media may affect social capital and mental health among students are not available. Therefore, this topic needs to be examined further.

7.7 Chapter summary

This study aimed to facilitate a cross-national comparison of the prevalence of depressive symptoms, suicidal ideation, and fair/poor self-rated health among university student in 12 countries. Around 48% of students showed signs of clinically relevant depressive symptoms, and 35% reported having had suicidal thoughts at least once. Furthermore, nearly one-fifth of respondents indicated having fair/poor health. In addition to relevant micro-level findings, the study also yielded important macro-level results and offers an important contribution to the social capital and health literature. By pulling back from the micro perspective, I was able to show what within-country studies have been unable to show: that social capital has an effect at the macro-level. Namely, countries with the highest levels of depressiveness seem to be ones

with high levels of corruption, ethnic conflict, political repression, and/or political instability, and they also seem to have the lowest levels of social capital. Due to the cross-sectional nature of the data, however, conclusions about causality cannot be made. Universities are advised to implement strategies such as social clubs to encourage students to refrain from time-out on phones and to engage instead in time-in with conversations with friends and classmates. Finally, enhancing social capital may help to reduce and prevent health inequalities among universities.

PART II

LGBQ Health

Chapter 1: Introduction

The research presented here was developed in addition to the SPLASH study. Previous work has demonstrated significantly higher rates of depression among lesbian, gay, bisexual, and queer (LGBQ) students than among their heterosexual peers (Eisenberg & Resnick, 2006; Ferlatte et al., 2019). Unfortunately, the sample (n = 7) in the SPLASH study was too small to investigate such differences. However, since the health inequalities/disparities among gender and sexual minority university students represent a public health problem, it deserves further attention. Therefore, a secondary data analysis of the Healthy Minds Study (HMS) data was performed. The HMS is a study conducted among US college students with the aim of providing a detailed picture of mental health and related issues and provides the largest database for gender and sexual minority students (Lipson, Raifman, et al., 2019). The study using HMS data aimed to detect whether there is a difference in mental health between LGBQ and heterosexual students, and to compare the effects of sexual orientation, history of sexual assault, and sense of belonging on depression and suicidality between LGBQ and heterosexual students. Part II has been structured using a paper-based format and is consequently kept brief. A modified version of this thesis part has been published in the Journal of American College Health (Backhaus et al. 2019).

1.1 Sense of belonging as an indicator of social capital?

Whether sense of belonging forms part of social capital or not is widely debated. Kawachi, Subramanian, and Kim (2008) do not consider sense of belonging to be part of social capital but see it as an intermediate variable instead. However, as previously mentioned, social capital consists of three main concepts – social network, trust, and participation. A sense of belonging is usually important for building trust, particularly among young people. Hence, especially for this group, it has been argued that sense of belonging does form part of social capital. Schaefer-McDaniel states that social capital among young people consists of three components: 1) social networks/interactions and sociability; 2) trust and reciprocity; and 3) sense of belonging/place attachment (Schaefer-McDaniel, 2004). Therefore, it seems feasible to also consider sense of belonging as part of social capital.

Chapter 2: Background

Mental health problems are highly prevalent among the college population, with elevated risks among those who do not explicitly present a heterosexual orientation (Cochran et al., 2003; Oswalt & Wyatt, 2011). One study showed that youth identifying as gay, lesbian, or bisexual (GLB) demonstrated odds of suicidal ideation and attempts that were 1.60–2.63 times those of non-GLB youth (Eisenberg & Resnick, 2006). Sexual orientation is generally defined by the sex of the person to whom an individual is sexually and emotionally attracted and includes LGBQ and heterosexual orientations (Greene, 1998). Studies examining sexual orientation and depression have also investigated the impact of gender identity on mental health and shown that individuals identifying as transgender are at a higher risk for depression (Walls et al., 2019). Gender identity describes the innermost concept of self as male, female, a blend of both, neither or how individuals perceive themselves. Although gender identity has a significant relationship with sexual orientation and mental health, the present study focuses exclusively on sexual orientation and mental health. Sexual orientation disparities (e.g., between heterosexual and LGBQ individuals) in depressive symptoms and suicidality represent a public health issue (Cochran et al., 2003; di Giacomo et al., 2018; Eisenberg & Resnick, 2006; Hottes et al., 2016; Oswalt & Wyatt, 2011).

Mental health problems during the college years are associated with a decreased energy level and concentration difficulties, thus hindering students' performance and often resulting in lower grade point averages and college retention (Bruffaerts et al., 2018; De Luca et al., 2016). Disruption in academic performance may have additional long-term consequences, such as limiting future employment and earning potential (Zimmermann et al., 2015). Given the high cost associated with depression among college students and the elevated risk for depression and suicidality among LGBQ students, it is critical to elucidate risk and protective factors for mental health problems among both LGBQ and heterosexual students.

One potential explanation for the disparities between sexual orientation groups could be the stigma, discrimination, and victimization experienced by students who identify as LGBQ (Meyer, 2003). The minority stress model, one of the most prominent theoretical frameworks

of health risks among LGBQ individuals, posits that sexual minorities experience unique stressors, including discrimination and stigma, and are at increased risk for violence and victimization, such as sexual assault (Blondeel et al., 2018; Espelage et al., 2012; Meyer, 2003).

Indeed, sexual assault has been shown to occur at higher rates among LGBQ individuals compared to their heterosexual peers, and to be associated with suicidal behaviors and depression (Blosnich & Bossarte, 2012; Coulter & Rankin, 2017; Eisenberg et al., 2017; Gold et al., 2007; Khadr et al., 2018; Thurston et al., 2019). However, not all individuals exposed to (traumatic) stressors develop adverse psychological outcomes (Lilly et al., 2011; Zhou et al., 2016). Accordingly, the minority stress theory also proposes stress–ameliorating factors, such as group cohesiveness and community connectedness, that may be protective and buffering and increase coping and resilience in the face of stressful life events (Nuttman-Shwartz & Dekel, 2009; Torgerson et al., 2018). As such, the social environment in which LGBQ students are embedded and their perceived roles and sense of belonging in it may play an important role in how they cope with traumatic stressors. For LGBQ people in particular, it is not uncommon to experience social exclusion and discrimination (Meyer, 2003). This can lead to isolation and/or a feeling that one does not "belong." A healthy sense of belonging, conceptualized as an individual's experience of feeling valued, needed, and accepted by a social system, is important for psychological well-being (Hagerty et al., 1992). The converse, characterized by a sense of disconnection and the feeling of not fitting in the social environment, could have negative implications for mental health outcomes.

Research has shown that college students with a lower sense of belonging display greater depressive symptoms (Gummadam et al., 2016). Furthermore, a thwarted sense of belonging, coupled with perceived burdensomeness, is significantly related to suicidal ideation across various populations (Joiner, 2005; Lockman & Servaty-Seib, 2016; Van Orden et al., 2008). A growing body of evidence also suggests that a sense of belonging has a buffering role in the relationship between traumatic experiences and adverse psychological outcomes after trauma (Nuttman-Shwartz & Dekel, 2009; Torgerson et al., 2018). Consequently, while sexual assault may have a negative effect on mental health, it is possible that a sense of belonging could buffer its impact. Limited research has examined the role of sexual assault and sense of

belonging in mental health outcomes among heterosexual students or among LGBQ students. Specifically, it is not known whether LGBQ students and their non-LGBQ peers respond similarly to traumatic events, or whether sense of belonging serves as a protective factor in the same way in these two groups. Therefore, the present study compared the effect of sexual assault and sense of belonging on depression and suicidal ideation among groups with a different sexual orientation. It was hypothesized that a high sense of belonging would be associated with overall lower depressive symptoms and suicidal ideation, and that it would play a protective role in the presence of sexual assault. Furthermore, it was anticipated that sense of belonging would have a more protective role against depressive symptoms and suicidal ideation among LGBQ than among heterosexual students.

Chapter 3: Methodology

This is a secondary data analysis of a subset of available data from the HMS, an annual cross-sectional web-based survey examining mental health, service utilization, and related factors among undergraduate and graduate students in the US. The HMS is conducted by researchers at the University of Michigan and Boston University. The present study analyzed data from 60 US campuses that participated in the HMS during the academic year 2017-2018. While most questions remain consistent across years some are not. The subset of data was chosen on the bases of the variables we were interested in investigating.

Colleges and universities elected to participate in the HMS; there were no exclusion criteria for institutional enrolment, and the institutional sample includes both two- and four-year campuses. Data were collected using Qualtrics software. The HMS was approved by the Institutional Review Boards on all campuses. A National Institutes of Health Certificate of Confidentiality provided further protections. At each institution enrolled in the HMS, a random sample of 4,000 degree-seeking students over the age of 18 were recruited from the full population to participate in the survey. At institutions with fewer than 4,000 students, all students were invited to participate. A sample of 4,000 was found to be sufficient to obtain precise, representative estimates of key measures such as the prevalence of mental health symptoms. Students were recruited via email. Upon clicking a personalized link in the email, they were presented with an informed consent page and had to agree to the terms of participation before entering the survey.

Accounting for survey non-response

A potential concern in any survey is that those who complete it are different in important ways from those who do not. To adjust for potential differences between responders and non-responders, researchers of the HMS have constructed sample probability weights using administrative data from participating institutions, including gender, race/ethnicity, academic level, and grade point average. These data have been utilized to construct response weights, equal to 1 divided by the estimated probability of response, using logistic regression to predict the likelihood of response associated with each variable. These weights were also applied in

the analyses of the present study, following the standard HMS approach as published in previous articles (Kern et al., 2018; Ketchen Lipson et al., 2015; Lipson et al., 2018).

3.1 Measures

Sexual orientation

The HMS questionnaire distinguishes between gender identity and sexual orientation. This study focused on sexual orientation, which refers to the sex of those to whom one is sexually and romantically attracted (American Psychological Association, 2012). Students' sexual orientation was measured with the following question: "How would you describe your sexual orientation?" The response scale was as follows: (1) Heterosexual, (2) Lesbian, (3) Gay, (4) Bisexual, (5) Queer and Questioning. For the data analysis, the answers were collapsed into a dichotomous variable (0 = heterosexual, 1 = LGBQ).

Sexual assault

Sexual assault was measured by asking individuals, "In the past 12 months, has anyone had unwanted sexual contact with you? Unwanted sexual contact meaning any experience of unwanted sexual contact [e.g., touching of your sexual body parts, oral sex, anal sex, sexual intercourse, and penetration of your vagina or anus with a finger or object] that one did not consent to and did not want to happen regardless of where it happened." The response was binary: 1 = yes, 0 = no.

Depression and suicidal ideation

Depression was measured using the Patient Health Questionnaire (PHQ-9), a multipurpose instrument for screening, diagnosing, monitoring, and measuring the severity of depression (Levis et al., 2019). The PHQ-9 asks respondents to indicate the frequency of various symptoms on a 4-point scale (0 = not at all, 1 = several days, 2 = more than half the days, 3 = nearly every day) over the past two weeks (Levis et al., 2019). The instrument yields scores ranging from 0 to 27, with higher scores indicating more severe depressive symptoms (Levis et al., 2019). The interpretation of the scores is shown in Table 19.

Table 19. Interpretatrion of the PHQ-9 scores

Total Score	Depression Severity
1 – 4	Minimal depression
5 – 9	Mild depression
10 – 14	Moderate depression
15 – 19	Moderately severe depression
20 – 27	Severe depression

The assessment of suicidal thoughts was based on item 9 of the PHQ-9, which asks respondents to indicate if they have had thoughts of hurting themselves in some way, or thoughts that they would be better off dead. Item 9 of the PHQ-9 is a robust predictor of suicide attempts, and the PHQ-9 is a reliable and valid measure of depression severity (Kroenke et al., 2001; Rossom et al., 2017). In the present study, Cronbach's alpha for the PHQ-9 was high (α = 0.89).

Sense of belonging index

Sense of belonging was assessed through a 4-item scale in which students were asked to indicate the degree to which they agreed or disagreed with each of the following statements: 1) "I see myself as part of the campus community," 2) "I fit in well at my school," 3) "I feel isolated from campus life," and 4) "Other people understand more than I do about campus life." Responses were recorded on a 6-point Likert scale (1 = strongly agree to 6 = strongly disagree). Items 1 and 2 were reverse coded, such that higher scores were indicative of a lower sense of belonging. One of the items was adapted from the Perceived Cohesion Scale, and three other items were adapted from the Sense of Social and Academic Fit Scale (Bollen & Hoyle, 1990; Walton & Cohen, 2007). The internal consistency of the sense of belonging index was acceptable (Cronbach's alpha = 0.74). A similar technique has previously been used in a study on individual-level social capital and major depression in the US (Fujiwara & Kawachi, 2008).

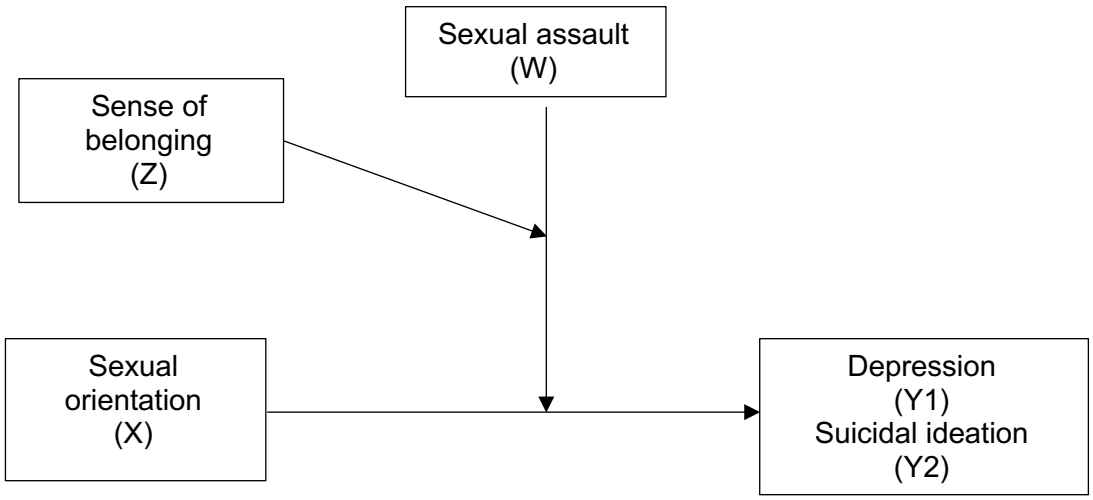
3.2 Data analyses

Descriptive statistics were conducted using chi-square tests for categorical variables and independent-sample t-tests for continuous variables. Given the large sample size, in order to evaluate practical significance, effect sizes were calculated. In particular, Cohen's d was used to indicate the standardized difference between two means (t-test), and Cramer's V (number of rows and/or columns are larger than 2) and Phi (Φ) were used for chi-square analyses. The PROCESS SPSS Macro version 3 was used to conduct two moderated moderation (i.e., three-way interaction) analyses. Both analyses included sexual orientation as the predictor, sexual assault as the primary moderator, and sense of belonging as the secondary moderator. In the first model, the outcome variable was depression, while in the second model it was suicidal ideation. Potential confounders were included in the model as covariates (sex at birth and age). Bootstrapping with 10,000 bootstrap resamples and a bias-corrected confidence estimate was applied. The statistical significance level for all the tests was set at a p-value of below 0.05. All analyses were conducted using SPSS 24.0 and were weighted using the sample probability weights described earlier.

3.3 The moderating role of sense of belonging

Moderated moderation is conceptually depicted in Figure 17. It shows that the effect of sexual orientation (X) on depression (Y1) and suicidal ideation (Y2) could be moderated by sexual assault (W) depending on sense of belonging (Z). In this study, LGBQ students who have experienced sexual assault are hypothesized to be even more likely to present depression than other LGBQ students. However, it is also hypothesized that LGBQ students who have a stronger sense of belonging may be less susceptible to the deleterious effects of sexual assault. In particular, having a strong sense of belonging could buffer the effects of sexual assault and therefore the prevalence of depression and suicidal ideation.

Figure 17. A conceptual model of sexual assault's moderation of the effect of sexual orientation on depression and suicidal ideation depending on sense of belonging



Note: The moderated moderation, or three-way interaction, is depicted in Figure 1, examining whether the association between sexual orientation (X) and depression (Y1) and suicidal ideation (Y2) is moderated by sexual assault (W) depending on sense of belonging (Z).

Chapter 4: Results

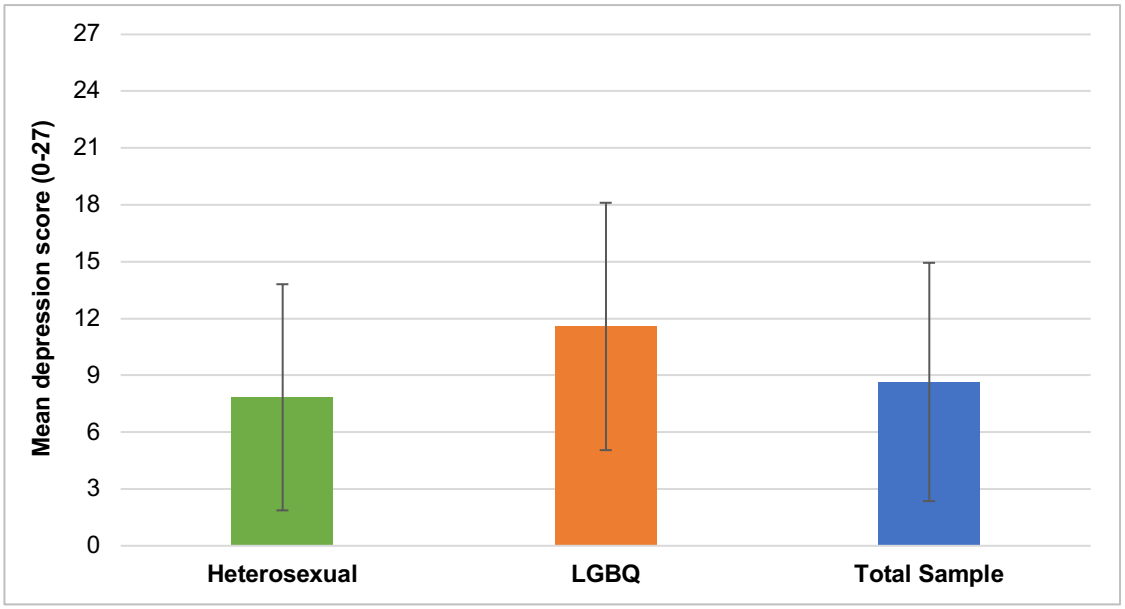
4.1 Sample characteristics

Table 20 presents the demographic characteristics of the entire sample in the study. The sample comprised 60,194 college students with a mean age of 21.94 years (SD = 4.10). The majority of participants were females (61.5%) and white (61.2%). Approximately 21% of students identified as LGBQ, including 5% gay or lesbian, 7% bisexual, and 7% queer or questioning. The number of students identifying as LGBQ in the HMS is equal to that found by the American College Health Association (American College Health Association, 2018; Bourdon et al., 2018). Namely, in the American College Health Association – National College Health Assessment II survey, around 20% of students indicated having a sexual orientation other than heterosexual. According to the Williams Institute, in the US, the general estimate of adults who identify as LGBQ is around 4.5%, and they tend to be younger, with 56% of LGBT adults being under the age of 35 years (The Williams Institute, 2019). Among the entire sample 10.3% of students have experienced sexual assault and almost 23% of students expressed suicidal ideation.

Depression, suicidal ideation, sexual assault, and sense of belonging

Table 21 presents baseline demographic characteristics for students identifying as heterosexual and LGBQ. More LGBQ students than heterosexual students reported having experienced sexual assault in the previous 12 months (Table 21). Differences were also observed for depression, with students identifying as LGBQ reporting more depressive symptoms than heterosexual students (M = 11.58, SD = 6.53 versus M = 7.84, SD = 5.97; d=0.60) (Figure 18). LGBQ students showed a higher mean score of sense of belonging (M = 11.15, SD = 5.88) than heterosexual students (M = 9.71 SD = 6.45), although the magnitude of the differences in the means was small (d=0.24) (Table 20).

Figure 18. Mean depression score with +/- 1 SD



Note: Difference between the two groups, heterosexual and LGBQ students, is significant, p<0.05, Cohen's d= 0.60

Sense of belonging seemed to play an important role among LGBQ students: at low sense of belonging, 55.2% of LGBQ students reported suicidal thoughts, compared to only 32.4% of heterosexual students (Figure 19).

Figure 19. Suicidal ideation at low sense of belonging and the presence of sexual assault

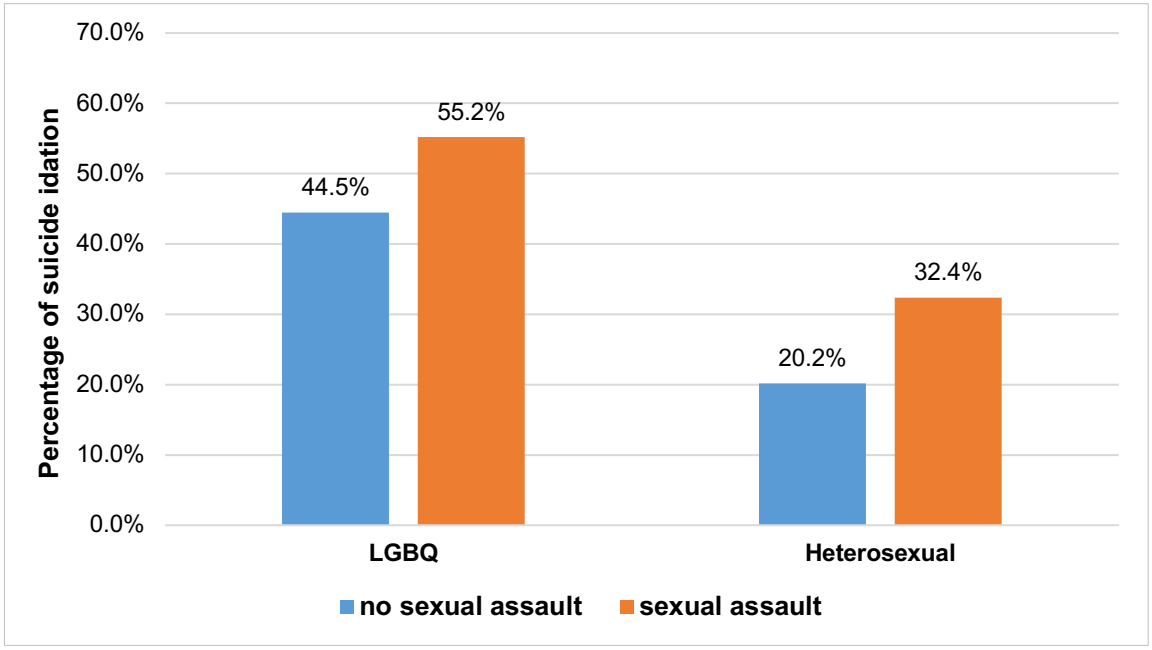


Table 20. Baseline demographic variables for the entire sample

	Total sample (n= 60194)
	N (%)
Mean age ± SD	21.94 (4.10)
Sex at birth (n= 87 (0.1%) missing)	
Male	23087 (38.4)
Female	36985 (61.5)
Intersex	35 (0.1)
Sexual orientation	
Heterosexual	48134 (79.2)
Lesbian	1178 (2.0)
Gay	2029 (3.4)
Bisexual	4409 (8.0)
Questioning and queer	4444 (7.4)
Race (n= 3 (0.0%) missing)	
Black	3600 (6.0)
White	36836 (61.2)
Hispanic/Latino	6790 (11.3)
Alaskan	1092 (1.8)
Asian	8914 (14.8)
Native Hawaiian or Pacific Islander	467 (0.8)
Middle Eastern or Arab	1427 (2.4)
Other	1065 (1.8)
Experienced sexual assault (n= 4529 (7.5%) missing)	
Yes	5725 (10.3)
No	49940 (89.7)
Mean sense of belonging Index ± SD	*10.01 (6.37)*
Suicidal ideation (n= 12581 (20.9%) missing)	
Yes	10848 (22.8)
No	36765 (77.2)

Note: Table values are of the weighted sample.

Table 21. Baseline demographic variables separated between heterosexual and LGBQ students

	Heterosexual N (%)	LGBQ N (%)	p-value	Effect size
Total	48134 (79.2)	12060 (20.8)		
Mean age (± SD)	22.09 (4.22)	21.27 (3.46)	p<0.005**	0.21[a]
Sex at birth				
Male	19753 (41.1)	3334 (27.7)		
Female	28293 (58.9)	8692 (72.2)		
Intersex	14 (0.0)	21 (0.2)	p<0.005*	0.11[b]
Race				
Black	2937 (6.1)	663 (5.5)		
White	29168 (60.6)	7668 (63.6)		
Hispanic/Latino	5372 (11.2)	1418 (11.8)		
Alaskan	837 (1.7)	255 (2.1)		
Asian	7374 (15.3)	1540 (12.8)		
Native Hawaiian or Pacific Islander	366 (0.8)	101 (0.8)		
Middle Eastern or Arab	1207 (2.5)	220 (1.8)		
Other	871 (1.8)	195 (1.6)	p<0.005*	0.04[b]
Experienced sexual assault				
Yes	3667 (8.3)	2058 (18.1)		
No	40645 (91.7)	9295 (81.9)	p<0.005*	0.13[c]
Mean sense of belonging Index (± SD)	*9.71 (6.45)*	*11.15 (5.88)*	p<0.005**	*0.24[a]*
Suicidal ideation				
Yes	6671 (17.9)	4177 (40.2)		
No	30543 (82.1)	6222 (59.8)	p<0.005*	0.29[c]

*Note: Table values are of the weighted sample. Effect size: [a]Cohen's d; [b]Cramer's V, [c]Phi (φ); p-value: *Chi-square p-value, **t-test p-value*

Bivariate correlations

Table 22shows the bivariate correlations between depression, suicidal ideation, sexual assault, and sense of belonging. Among both groups of students, depression was positively and strongly correlated with suicidal ideation (LGBQ: r = 0.59, p<0.001; heterosexual: r = 0.57, p<0.001). Furthermore, a small positive correlation was demonstrated between history of sexual assault and depression (LGBQ: r = 0.14, p<0.001; heterosexual: r = 0.15, p<0.001).

Table 22. Bivariate correlations between depression, suicidal ideation, sexual assault, and sense of belonging for LGBQ and heterosexual students

Variables	Depression	Sexual assault	Sense of belonging	Suicidal ideation
Depression		0.14*	-0.18*	0.59*
Sexual assault	0.15*		-0.01	0.07*
Sense of belonging	-0.10*	0.02*		-0.12*
Suicidal ideation	0.57*	0.09*	-0.08*	

*Note: *p<0.001; LGBQ (upper diagonal) and heterosexual students (lower diagonal)*

4.2 Three-way interaction

The following sections reports findings of the three-way interaction analyses, or also moderated-moderation analyses. First results for the three-way interaction analysis on depressive symptoms are reported, followed by results for the three-way interaction analysis on suicidal ideation.

Sexual orientation, sexual assault, sense of belonging, and depressive symptoms

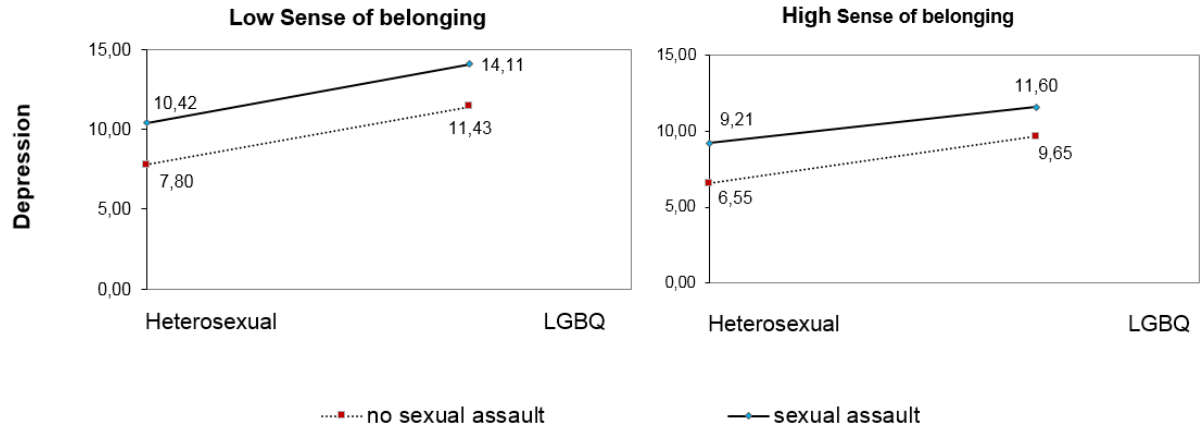
In the model examining sexual orientation, sexual assault, and sense of belonging as predictors of depressive symptoms, the three-way interaction was significant (b = -0.06, p=0.042, 95%CI: -0.12 – -0.00) (Table 23). The PROCESS outcome showed that the two-way interaction between sexual orientation and history of sexual assault predicting depressive symptoms was significant at high sense of belonging (b = -0.71, p<0.005), but not at low sense of belonging (p>0.005). At high sense of belonging, there was a significant difference between the slopes of

LGBQ and heterosexual students in the absence (b = 3.09, 95%CI: 2.91 – 3.29) and presence of sexual assault (b = 2.38, 95%CI: 1.93 – 2.84). Specifically, at high sense of belonging, both LGBQ and heterosexual students experienced a higher level of depressive symptoms in the context of sexual assault, but the difference in severity was significantly greater among heterosexual students. At low sense of belonging, the difference in severity of depressive symptoms between those with and without a history of sexual assault was not significantly different between LGBQ and heterosexual students (Figure 20). Thus, at low sense of belonging, sexual assault was associated with a similarly higher level of depressive symptoms in the two groups. The overall model was significant (F (9-49551)= 623.27, p<0.001) and explained 10% of the variance.

Table 23. Moderation effects of sexual assault on the relationship between identifying as LGBQ and depression

	b	**SE**	**t**	**p-value**	**95% CI**
Constant	12.03	0.167	71.91	<0.001	11.70 - 12.36
LGBQ (X)	3.81	0.149	25.55	<0.001	3.51 - 4.10
Sexual assault	2.61	0.194	13.44	<0.001	2.23 - 2.99
Sense of belonging	-0.10	0.005	-20.89	<0.001	-0.01 - -0.09
LGBQ * sexual assault	0.31	0.371	0.82	0.409	-0.42 - 1.03
LGBQ * sense of belonging	-0.04	0.012	-3.61	0.003	-0.07 - -0.02
Sexual assault * sense of belonging	0.003	0.016	0.17	0.867	-0.03 - 0.034
LGBQ * sexual assault * sense of belonging	-0.06	0.030	-2.03	0.042	-0.12 - -0.002
R^2= 0.319, MSE=32.75, F=623.27					

Figure 20.The conditional effect of sexual orientation on depression as a function of sexual assault and sense of belonging



Sexual orientation, sexual assault, sense of belonging, and suicidal ideation

Table 24 shows the moderation effects of sexual assault on the relationship between being LGBQ and suicidal ideation. In this model examining sexual orientation, sexual assault, and sense of belonging predicting suicidal ideation, the three-way interaction was significant (b = -0.10, 95%CI: -0.02 – -0.00). The two-way interaction between sexual orientation and presence of sexual assault predicting suicidal ideation was significant at low sense of belonging (b= 0.090, p = 0.002) but not at high levels of sense of belonging. At low sense of belonging to the college, there was a significant difference between the slopes of LGBQ and heterosexual students during the absence (b= 0.345, 95%CI: 0.32 – 0.37) and presence of sexual assault (b= 0.436, 95%CI: 0.38 – 0.49). Specifically, while both LGBQ and heterosexual students reported higher suicidal ideation in the context of sexual assault, suicidal ideation was significantly higher among LGBQ than among heterosexual students. At high sense of belonging, in contrast, both LGBQ and heterosexual students with a history of sexual assault reported higher suicidal ideation compared to their peers without this history, and the magnitude of the difference was similar in both groups (Figure 21). Specifically, sense of belonging exerted a similar protective effect in the two groups. The overall model was significant (F (9-49484)= 345.53, p<0.001) and explained 6% of the variance.

Figure 21.The conditional effect of sexual orientation on suicidal ideation as a function of sexual assault and sense of belonging

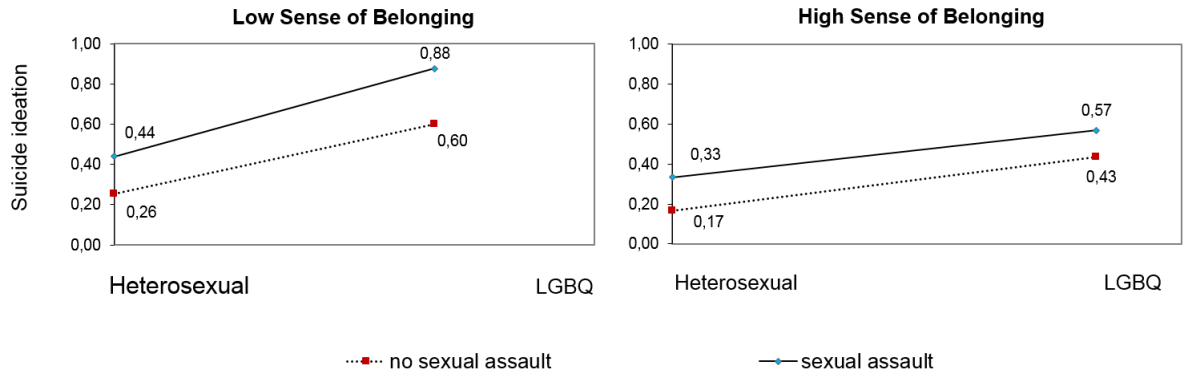


Table 24. Moderation effects of sexual assault on the relationship between being LGBQ and suicidal ideation

	b	SE	t	p-value	95% CI
Constant	0.54	0.019	28.60	<0.001	0.50 - 0.58
LGBQ (X)	0.37	0.017	22.08	<0.001	0.34 - 0.40
Sexual assault (W)	0.19	0.012	8.66	<0.001	0.15 - 0.23
Sense of belonging (Z)	-0.01	0.005	-13.04	<0.001	-0.008 - -0.006
LGBQ * sexual assault	0.13	0.042	3.15	0.025	0.05 - 0.21
LGBQ * sense of belonging	-0.01	0.001	-4.66	<0.001	-0.001 - 0.004
Sexual assault * sense of belonging	-0.01	0.002	-0.77	0.439	-0.005 - 0.002
LGBQ * sexual assault * sense of belonging	-0.10	0.003	-2.91	0.004	-0.02 - -0.003
R^2= 0.2432, MSE=0.416, F=345.53					

Chapter 5: Discussion

The present study sought to compare the effect of sexual assault and sense of belonging on the presence of depression and suicidal ideation between LGBQ and heterosexual students. Overall, the results suggest different effects between the two groups.

Consistent with the minority stress model and with previous studies, LGBQ students in this sample had a significantly higher severity of depression (d = 0.60), rates of suicidal thoughts, and rates of reported sexual assault than the heterosexual students (Coulter & Rankin, 2017; Eisenberg et al., 2017; Meyer, 2003).

Unlike in other studies, LGBQ students had a slightly higher sense of belonging than the heterosexual students (Galliher et al., 2004; Pakula et al., 2016). It is important to highlight that the HMS assesses "sense of belonging to the college." While the practical significance of the difference is questionable, the slightly higher rates might be explained by the fact that many colleges included in the HMS are LGBQ friendly. According to the Campus Pride Index, which measures campus policies and resources pertaining to LGBQ students, 60% of campuses participating in the HMS in 2017-2018 were LGBQ friendly (Campus Pride, 2019). LGBQ students may be drawn to attend institutions that have a reputation for being supportive of the LGBQ community (Schneider & Dimito, 2010). Therefore, it is possible that students identifying as LGBQ feel they belong to the campus community, while feeling excluded from general society. Pro-LGBTQ messaging has been shown to positively influence LGBQ students' sense of belonging at university (Vaccaro & Newman, 2017). Furthermore, LGBQ students' sense of belonging might be higher because they receive more social support than heterosexual students. Research has shown that gay men and lesbian women receive more social support from friends than heterosexual men and women do (Detrie & Lease, 2007; Ueno, 2005). However, it is possible that the surveyed LGBQ students were experiencing depressive symptoms from environmental factors such as discrimination outside the college campus. It is also important to note that while the difference in sense of belonging was significant, the magnitude of the difference was small (effect size: d = 0.24)

When the effect of sexual assault and the protective role of sense of belonging were examined together, it was observed that, as hypothesized, the effect of sexual assault on depression and suicidal ideation differed depending on students' degree of sense of belonging and sexual orientation. As expected, a high sense of belonging acted as a protective factor in the presence of a sexual assault history, while its absence had deleterious consequences on mental health. However, the magnitude of the effects differed between the two groups. At low sense of belonging, history of sexual assault was associated with a similarly greater level of depressive symptoms for both LGBQ and heterosexual students. Conversely, high sense of belonging acted as a protective factor among all students, but it exerted a stronger buffer effect against depressive symptoms among LGBQ students than heterosexual students. Thus, the results support the notion that a high sense of belonging may act as an important resiliency factor for LGBQ students with a history of sexual assault. These findings are important because in general, LGBQ students are more likely to report sexual assault and greater depressive symptoms than heterosexual students are. Strengthening their sense of belonging could help to prevent a further decline of LGBQ students' mental health, especially after experiencing sexual assault.

With regard to suicidal ideation, high sense of belonging had a buffer effect of similar magnitude for both heterosexual and LGBQ students with a history of sexual assault. Conversely, the combination of experiencing a sexual assault and having a low sense of belonging had a significantly higher deleterious effect on suicidal ideation among LGBQ students than among their heterosexual peers.

The protective effect of sense of belonging may be explained in two ways. First, one's perception of feeling accepted and valued by friends, classmates and the community in general, is likely to increase sense of belonging, thereby facilitating psychological well-being. Second, sense of belonging might foster trust. Students who are embedded in a trusting and inclusive environment may find it easier to seek support for sexual assault or mental health problems (Pisani et al., 2012). The need to belong is widely theorized to be fundamental for psychological and physical well-being (Hagerty et al., 1992). Moreover, associations have been shown between sexual assault and a range of adverse outcomes, including depression, post-

traumatic stress disorder, and suicidality (Dworkin et al., 2009; Eadie et al., 2008; Gold et al., 2007; Rosellini et al., 2017).

This study's findings extend current knowledge by showing that high sense belonging is not only associated with better mental health outcomes across populations but can also have a protective effect in the presence of adversity (Bourdon et al., 2018; Gummadam et al., 2016). LGBQ students appear to experience an added benefit from having a high sense of belonging, but also seem to be more negatively affected by a lack of it compared to their heterosexual peers. In this study, suicidal ideation was higher in the presence of sexual assault and when lacking sense of belonging. Among LGBQ students, high sense of belonging may increase resilience and protect against suicidal ideation, while a low sense of belonging may be associated with an increased feeling of isolation and hence suicidal ideations. As posited by the minority stress model, individuals identifying as LGBQ are more likely to experience discrimination and victimization. Therefore, having a high sense of belonging might play a stronger role among LGBQ students, and it may buffer the stressors experienced by LGBQ students. Conversely, heterosexual students may experience depressive symptoms and suicidal ideation for other reasons, and sense of belonging may not play as much of a critical role.

Implications for health promotion

Given that LGBQ students have more depressive symptoms overall, it is critical to identify factors that lessen their severity. This study extends the knowledge in this area. In light of the positive effect of sense of belonging on (LGBQ) students' mental health, universities should investigate whether and how their students feel supported. They could start by ensuring that policies and initiatives promoting inclusion are in place. Examples that could foster a sense of belonging include the introduction and/or support of LGBQ straight allies (e.g., a group that supports LGBQ rights), student organizations and counselling centers specific to the needs of LGBQ students, a campus non-discrimination policy that protects against homophobic discrimination as well as creating safe spaces on campus, and sensitivity trainings for faculty, staff, and students alike. There is also a need for queer studies to be integrated into the curriculum, particularly because LGBQ students have noted that this as an important

protective factor against heterosexist discrimination (Woodford et al., 2018): it can foster LGBQ students' acceptance and social inclusion, thereby indirectly promoting their psychological well-being (Woodford et al., 2018). Furthermore, the results suggest that providers treating LGBQ students with depression or suicidal ideation in the context of sexual assault should assess the level of sense of belonging and possibly enhance it.

Implications for LGBQ research

Besides individual-level factors, it is possible that macro-level factors also influence LGBQ students' mental health. For example, states without LGBQ protective policies tend to have a higher percentage of conservative voters (White Hughto et al., 2016). Prior research has linked the proportion of Republican voters at the neighborhood level with an increased risk of depression among sexual minority young adults (Everett, 2014). Geographic disparities in legal protections for LGBQ people, along with incongruent social climates across states, call for a geographically contextualized multilevel analysis. To date, however, only very few studies have explored whether geographic and contextual factors, such as political affiliation at the state level, are associated with poorer mental health among LGBQ individuals. Therefore, future research on LGBQ students' health should include multilevel models.

5.1 Methodological considerations

5.1.1 Strengths and limitations

The present study has various strengths, such as its large, diverse, and randomly selected student sample drawn from multiple colleges across the US, including a large sample of LGBQ students, thus providing new data on these students' mental health. Nonetheless, several limitations must also be highlighted. First, the study relied on self-report data, which is subject to information and recall bias. Second, the data used were cross-sectional; therefore, inferences about causality and the temporal ordering of the variables cannot be made. In addition, a validated measure of belonging could increase the reliability of the study's findings. The sense of belonging index was narrowly focused on belonging to the campus community, and not to LGBQ-specific or other communities (e.g., sports clubs). However, it is important to examine whether the effect of sense of belonging is limited to the campus community, or if other factors

might also play a role. Third, the survey had an overall response rate of just under 23%. Although the sample probability weights adjust for potential differences between responders and non-responders, I cannot exclude response bias due to other unobserved characteristics. Fourth, the HMS questionnaire did not include specific questions on the quality of the campus climate in general. Yet, the quality of the campus climate and perceived inclusiveness can contribute to LGBQ students' health. For example, research has demonstrated that a negative climate comprised of "heterosexist" and anti-gay attitudes contributes to LGBQ students' interpersonal distress (Silverschanz et al., 2008).

Chapter 6: Conclusion

The present study has illuminated an important and previously unexplored pathway between sexual assault, sense of belonging, and mental health among individuals identifying as LGBQ, and it has compared it to the pathway found among heterosexual students. This research represents an important step in furthering the understanding of mental health disparities in LGBQ college students. The findings highlight the need to reduce mental health problems and sexual assault on college campuses, as well as to foster a sense of belonging. Further longitudinal studies should continue to examine stressors and protective factors that account for mental health disparities between LGBQ and heterosexual students.

PART III

CONCLUSION

PART III: Conclusion

There is no doubt that young university students are facing a serious health crisis. Recent research has demonstrated significant country variations in mental health issues, as well as significantly higher rates of such issues among LGBQ students than heterosexual students. A growing number of studies suggest that social capital is a determinant of population health. Until now evidence is limited to adolescents and adult studies, and most studies have focused primarily on one geographical area. To identify factors associated with poor health among university student, two different studies were conducted. The first study aimed to investigate the association between social capital and university students' depressiveness and suicidal ideation in 12 countries. The second study aimed to detect differences in mental health between students with a sexual orientation other than heterosexual, and to determine potential moderators, such as sense of belonging and sexual assault. Specifically, the goal was to identify whether a high sense of belonging would be associated with overall fewer depressive symptoms and lower suicidal ideation, and whether it would play a moderating role in the presence of sexual assault.

Data for the first study were derived from the SPLASH study, which is an ongoing international two-wave panel study on university students' health. Data for the second study were derived from the 2017-2018 HMS.

The SPLASH study revealed a very high prevalence of clinically relevant depressive symptoms as well as suicidal ideation, with great variations between countries. By far the highest prevalence of both was found in students from Brazil. Furthermore, at the individual level, socioeconomic status, perceived stress, hazardous alcohol consumption, and lower levels of both cognitive and behavioral social capital were significantly related to depressiveness and suicidal ideation. These findings are consistent with previous studies on the effect of individual characteristics and individual-level social capital and health. An important aspect of the SPLASH study is that there are not only individual factors but also factors concerning country-level social capital explaining students' health. Indeed, students had a greater likelihood of reporting depressiveness in countries that had a lower level of

social capital. Another important finding is that country-level characteristics such as perceived corruption and economic development negatively influenced students' health. In light of the findings of the SPLASH study, contextual factors and social capital at the macro-level could plausibly be associated with health. Brazil, in particular, is going through a turbulent phase characterized by slow economic growth, political instability, and low expenditure on social services. When the SPLASH study was conducted, anti-government protests were taking place and the government had just announced that it would be cutting funding and scholarships on which a great number of students were dependent. It is highly likely that those contextual factors were the greatest contributor to the extraordinarily poor mental health among Brazilian students.

The secondary data analyses of the HMS showed a very high prevalence of health disparities between LGBQ and heterosexual students. In line with previous findings, students identifying as LGBQ reported greater depressiveness and suicidal ideation compared to their heterosexual counterparts. The high levels of depression and suicidal ideation experienced by LGBQ students can be traced, at least in part, to sexual assault and low levels of sense of belonging. The three-way interaction analysis showed that the effect of sexual assault on mental health differed depending on sexual orientation and sense of belonging. High sense of belonging was particularly protective in the presence of sexual assault among LGBQ students. In contrast, low sense of belonging had a deleterious effect on mental health. Thus, the results suggest that enhancing sense of belonging would improve LGBQ students' mental health.

Strengths and limitations

Both of the present studies should be considered in light of their potential strengths and limitations. First, they both relied on self-report data, which is subject to information and recall bias. Second, they both used cross-sectional data, which provides only a snapshot of mental health problems among university students and does not allow for inferences to be made about causality and the temporal ordering of the variables. For example, it was not possible to ascertain whether social capital influenced health or vice versa. A longitudinal study would have been preferable but would have required a substantial amount of time and funding.

Nonetheless, the SPLASH study was the first to examine the prevalence of mental health issues in relation to social capital across a wide range of universities worldwide, and it offered new findings on social capital at the macro-level. In particular, by pulling back from the micro perspective, the study showed what within-country studies are unable to show: specifically, that countries with the highest levels of depression seem to be those with high levels of corruption, ethnic conflict, political repression, and/or political instability, and with the lowest levels of social capital.

Furthermore, the HMS study was probably the first to investigate the potential three-way interaction effects of sexual assault and sense of belonging among LGBQ and heterosexual students, and it provided new data on LGBQ students' mental health.

Implications and contributions

From a public health perspective, both studies have contributed to research on social capital and yielded new insights into factors that may cause health disparities among university students. The results suggest that interventions targeting social capital during college years should be implemented. Establishing social clubs where students can connect with each other may be one possibility. For students identifying as LGBQ, sense of belonging seems to be an important determinant mental health. Specific to the LGBQ student community, universities may consider introducing LGBQ straight allies, a group that supports LGBQ rights. University may also consider developing for-credit courses that teach about the specific needs of LGBQ students. These could increase sense of belonging, which could in turn increase trust and social capital.

Considering the findings of the SPLASH study, three priority research areas have been identified. First, the cross-sectional study presented here cannot establish beyond a doubt that social capital enduringly fosters good mental health. It could be that mentally healthy students are simply more socially active, or that mentally ill students are less so. Future research on social capital including both multilevel approaches and longitudinal data analysis will be important in establishing robust evidence of the causal effect between social capital and health. Second, although this study has made a potentially significant contribution to social capital

research at the macro-level, research on macro-level social capital remains scarce. Thus, further research should focus on the macro-level aspects social capital and its links to mental health. Third, specific attention should be drawn to potential interaction effects between individual level factors and contextual factors. It is important to continue to investigate possible associations between social capital and poor health in different countries due to the different political contexts, socioeconomic characteristics, and cultures. Results of such studies may help to develop a more focused approach directed towards the specific characteristics of a country, instead of broad and general health interventions being adopted based on health and social capital.

Concerning health disparities between LGBQ and heterosexual students, additional efforts should be made to explore contributing factors and mechanisms. The study using HMS data presented in part II of this thesis focused on college sense of belonging. However, it is possible that students felt they belonged to the campus community but not to general society. Thus, future research should also focus on sense of belonging to the general community. Moreover, multilevel studies assessing state-level factors (e.g., inclusive policies) should be conducted. In particular, because similar to the SPLASH findings, it is possible that certain contextual factors contributed to health disparities found in the HMS results.

Final conclusion

The analysis of the HMS data illuminated an important and previously unexplored pathway between sexual assault, sense of belonging, and mental health among individuals identifying as LGBQ, thus making an important contribution to understanding mental health disparities in LGBQ students. Sense of belonging may serve as a protective factor against depression and suicidal ideation after exposure to violence for students who identify as LGBQ. Therefore, improving sense of belonging represents an important strategy to mitigate depression and suicide, particularly among LGBQ students.

The findings of the SPLASH study suggest that, at both the micro and the macro-level, social capital is likely to play an important role in the health of university students. Given the macro-level findings, students' level of mental health might reflect broader social and political

problems in society. Therefore, the policy prescription is not only to improve individual-level social capital, but also to turn the focus towards the wider social and political context of a country.

One must keep in mind that good health is essential for young people, as it lays the foundation for well-being and economic prosperity in later life. While we tend to think of university students as being a cosseted and privileged group in society due to their age and social standing, the findings of this study suggest that they can also be "canaries in the coalmine."

6.1 Personal reflection

Undertaking this research PhD has been an invaluable learning experience. It gave me the opportunity to become familiar with social epidemiology, a research field that was fairly new to me. It also taught me that there is much more to investigate in relation to students' health and social capital, and it has surely provided me with some key ideas for my next studies. Furthermore, this PhD research helped me examine my own personal and professional values and made me realize the importance of my personal social networks and of social epidemiology. Moreover, I have learned that research can be frustrating and sometimes tedious, yet at other times immensely rewarding and even exciting. My own view today is that similar to health inequalities overall, inequalities in students' health arise because of social disparities – whether disadvantaged students cannot take part in sports clubs or social activities after school because they lack money, or because they feel excluded due to their sexual orientation. In any case, it is important to engage students, to promote social activities, to encourage them to connect with others, and to increase their social capital.

References

Al-Busaidi, Z., Bhargava, K., Al-Ismaily, A., Al-Lawati, H., Al-Kindi, R., Al-Shafaee, M., & Al-Maniri, A. (2011). Prevalence of Depressive Symptoms among University Students in Oman. *Oman Medical Journal*, *26*(4), 235–239. https://doi.org/10.5001/omj.2011.58

Alsubaie, M. M., Stain, H. J., Webster, L. A. D., & Wadman, R. (2019). The role of sources of social support on depression and quality of life for university students. *International Journal of Adolescence and Youth*, *0*(0), 1–13. https://doi.org/10.1080/02673843.2019.1568887

American College Health Association. (2018). *National College Health Assessment II: Reference Group Executive Summary Spring 2018*. https://www.acha.org/documents/ncha/NCHA-

American Psychiatric Association. (2006). *Practice Guideline for the Assessment and Treatment of Patients With Suicidal Behaviors* (1st ed., Vol. 1). American Psychiatric Association. https://doi.org/10.1176/appi.books.9780890423363.56008

American Psychological Association. (2012). Guidelines for psychological practice with lesbian, gay, and bisexual clients. *The American Psychologist*, *67*(1), 10–42. https://doi.org/10.1037/a0024659

Andreou, E., Alexopoulos, E. C., Lionis, C., Varvogli, L., Gnardellis, C., Chrousos, G. P., & Darviri, C. (2011). Perceived Stress Scale: Reliability and validity study in Greece. *International Journal of Environmental Research and Public Health*, *8*(8), 3287–3298. https://doi.org/10.3390/ijerph8083287

Arnett, J. J. (2000). Emerging adulthood. A theory of development from the late teens through the twenties. *The American Psychologist*, *55*(5), 469–480.

Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., Kessler, R. C., & WHO WMH-ICS Collaborators. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology*, *127*(7), 623–638. https://doi.org/10.1037/abn0000362

Backhaus, I., D'Egidio, V., Saulle, R., Masala, D., Firenze, A., De Vito, E., Mannocci, A., & La Torre, G. (2019). Health-related quality of life and its associated factors: Results of a multi-center cross-sectional study among university students. *Journal of Public Health (Oxford, England)*. https://doi.org/10.1093/pubmed/fdz011

Backhaus, I., Lipson, S., Fisher, L., Kawachi, I., & Pedrelli, P. (2019). Sexual assault, sense of belonging, depression and suicidality among LGBQ and heterosexual college students. *Journal of American College Health*. https://doi.org/10.1080/07448481.2019.1679155

Baer, N., Schuler, D., Füglister-Dousse, S., & Moreau-Gruet, F. (2013). *Depressionen in der Schweiz. Daten zur Epidemiologie, Behandlung und sozial-beruflichen Integration (Obsan Bericht 56)*.

http://www.obsan.admin.ch/sites/default/files/publications/2015/obsan_56_bericht.pdf

Bandiera, F. C., Loukas, A., Wilkinson, A. V., & Perry, C. L. (2016). Associations between tobacco and nicotine product use and depressive symptoms among college students in Texas. *Addictive Behaviors*, *63*, 19–22. https://doi.org/10.1016/j.addbeh.2016.06.024

Barker, E. T., Howard, A. L., Villemaire-Krajden, R., & Galambos, N. L. (2018). The Rise and Fall of Depressive Symptoms and Academic Stress in Two Samples of University Students. *Journal of Youth and Adolescence*, *47*(6), 1252–1266. https://doi.org/10.1007/s10964-018-0822-9

Bartley, M. (2016). *Health Inequality: An Introduction to Concepts, Theories and Methods*. John Wiley & Sons.

Bassett, E., & Moore, S. (2013). Social capital and depressive symptoms: The association of psychosocial and network dimensions of social capital with depressive symptoms in Montreal, Canada. *Social Science & Medicine*, *86*, 96–102. https://doi.org/10.1016/j.socscimed.2013.03.005

Baum, F. E., & Ziersch, A. M. (2003). Social capital. *Journal of Epidemiology & Community Health*, *57*(5), 320–323. https://doi.org/10.1136/jech.57.5.320

Bayram, N., & Bilgel, N. (2008). The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Social Psychiatry and Psychiatric Epidemiology*, *43*(8), 667–672. https://doi.org/10.1007/s00127-008-0345-x

Beilmann, M., Kööts-Ausmees, L., & Realo, A. (2018). The Relationship Between Social Capital and Individualism–Collectivism in Europe. *Social Indicators Research*, *137*(2), 641–664. https://doi.org/10.1007/s11205-017-1614-4

Bennett, T. H., & Holloway, K. R. (2015). Drug use among college and university students: Findings from a national survey. *Journal of Substance Use*, *20*(1), 50–55. https://doi.org/10.3109/14659891.2013.878762

Biddle, S. (2016). Physical activity and mental health: Evidence is growing. *World Psychiatry*, *15*(2), 176–177. https://doi.org/10.1002/wps.20331

Binkin, N., Gigantesco, A., Ferrante, G., & Baldissera, S. (2010). Depressive symptoms among adults 18-69 years in Italy: Results from the Italian behavioural risk factor surveillance system, 2007. *International Journal of Public Health*, *55*(5), 479–488. https://doi.org/10.1007/s00038-009-0106-y

Bland, J. M., & Altman, D. G. (1997). Statistics notes: Cronbach's alpha. *BMJ*, *314*(7080), 572. https://doi.org/10.1136/bmj.314.7080.572

Blondeel, K., de Vasconcelos, S., García-Moreno, C., Stephenson, R., Temmerman, M., & Toskin, I. (2018). Violence motivated by perception of sexual orientation and gender identity: A systematic review. *Bulletin of the World Health Organization*, *96*(1), 29-41L. https://doi.org/10.2471/BLT.17.197251

Blosnich, J., & Bossarte, R. (2012). Drivers of disparity: Differences in socially based risk factors of self-injurious and suicidal behaviors among sexual minority college

students. *Journal of American College Health: J of ACH*, *60*(2), 141–149. https://doi.org/10.1080/07448481.2011.623332

Bollen, K. A., & Hoyle, R. H. (1990). Perceived Cohesion: A Conceptual and Empirical Examination. *Social Forces*, *69*(2), 479–504. JSTOR. https://doi.org/10.2307/2579670

Borges, C. M., Campos, A. C. V., Vargas, A. D., Ferreira, E. F., & Kawachi, I. (2010). Social capital and self-rated health among adolescents in Brazil: An exploratory study. *BMC Research Notes*, *3*, 338. https://doi.org/10.1186/1756-0500-3-338

Bourdieu, P. (1986). *'The Forms of Capital' in Handbook of Theory and Research for the Sociology of Education*.

Bourdon, J. L., Saunders, T. R., & Hancock, L. C. (2018). Acknowledgement and Support Matter: A Brief Report on Gender Identity and Sexual Orientation at a Large, Urban University. *Journal of American College Health : J of ACH*, *66*(8), 809–812. https://doi.org/10.1080/07448481.2018.1432627

Brinkworth, R., McCann, B., Matthews, C., & Nordström, K. (2009). First year expectations and experiences: Student and teacher perspectives. *Higher Education*, *58*(2), 157–173. https://doi.org/10.1007/s10734-008-9188-3

Bruffaerts, R., Mortier, P., Kiekens, G., Auerbach, R. P., Cuijpers, P., Demyttenaere, K., Green, J. G., Nock, M. K., & Kessler, R. C. (2018). Mental health problems in college freshmen: Prevalence and academic functioning. *Journal of Affective Disorders*, *225*, 97–103. https://doi.org/10.1016/j.jad.2017.07.044

Buckner, J. D., Keough, M. E., & Schmidt, N. B. (2007). Problematic Alcohol and Cannabis Use among Young Adults: The Roles of Depression and Discomfort and Distress Tolerance. *Addictive Behaviors*, *32*(9), 1957–1963. https://doi.org/10.1016/j.addbeh.2006.12.019

Busch, M. A., Maske, U. E., Ryl, L., Schlack, R., & Hapke, U. (2013). [Prevalence of depressive symptoms and diagnosed depression among adults in Germany: Results of the German Health Interview and Examination Survey for Adults (DEGS1)]. *Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz*, *56*(5–6), 733–739. https://doi.org/10.1007/s00103-013-1688-3

Bush, K., Kivlahan, D. R., McDonell, M. B., Fihn, S. D., & Bradley, K. A. (1998). The AUDIT alcohol consumption questions (AUDIT-C): An effective brief screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. *Archives of Internal Medicine*, *158*(16), 1789–1795.

Campbell, C. E., & Maisto, S. A. (2018). Validity of the AUDIT-C screen for at-risk drinking among students utilizing university primary care. *Journal of American College Health: J of ACH*, *66*(8), 774–782. https://doi.org/10.1080/07448481.2018.1453514

Campus Pride. (2019). *Campus Pride Index*. https://www.campusprideindex.org/

Chaddock, L., Erickson, K. I., Prakash, R. S., Voss, M. W., VanPatter, M., Pontifex, M. B., Hillman, C. H., & Kramer, A. F. (2012). A functional MRI investigation of the

association between childhood aerobic fitness and neurocognitive control. *Biological Psychology*, *89*(1), 260–268. https://doi.org/10.1016/j.biopsycho.2011.10.017

Chen, C.-J., Chen, Y.-C., Sung, H.-C., Hsieh, T.-C., Lee, M.-S., & Chang, C.-Y. (2015). The prevalence and related factors of depressive symptoms among junior college nursing students: A cross-sectional study. *Journal of Psychiatric and Mental Health Nursing*, *22*(8), 590–598. https://doi.org/10.1111/jpm.12252

Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *The New England Journal of Medicine*, *357*(4), 370–379. https://doi.org/10.1056/NEJMsa066082

Clemente, F. M., Nikolaidis, P. T., Martins, F. M. L., & Mendes, R. S. (2016). Physical Activity Patterns in University Students: Do They Follow the Public Health Guidelines? *PloS One*, *11*(3), e0152516. https://doi.org/10.1371/journal.pone.0152516

Cochran, S. D., Sullivan, J. G., & Mays, V. M. (2003). Prevalence of Mental Disorders, Psychological Distress, and Mental Health Services Use Among Lesbian, Gay, and Bisexual Adults in the United States. *Journal of Consulting and Clinical Psychology*, *71*(1), 53–61.

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385–396.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, *98*(2), 310–357.

Cohen-Cline, H., Beresford, S. A., Barrington, W., Matsueda, R., Wakefield, J., & Duncan, G. E. (2018). Associations between social capital and depression: A study of adult twins. *Health & Place*, *50*, 162–167. https://doi.org/10.1016/j.healthplace.2018.02.002

Coleman, J. S. (1988). *Social Capital in the Creation of Human Capital*. *94*, S95–S120.

Coulter, R. W. S., & Rankin, S. R. (2017). College Sexual Assault and Campus Climate for Sexual- and Gender-Minority Undergraduate Students. *Journal of Interpersonal Violence*, 886260517696870. https://doi.org/10.1177/0886260517696870

Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J. F., & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, *35*(8), 1381–1395. https://doi.org/10.1249/01.MSS.0000078924.61453.FB

Crocker, J., & Luhtanen, R. K. (2003). Level of self-esteem and contingencies of self-worth: Unique effects on academic, social, and financial problems in college students. *Personality & Social Psychology Bulletin*, *29*(6), 701–712. https://doi.org/10.1177/0146167203029006003

CSDH (Ed.). (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health ; final report*. world Health Organization.

Dahlgren, G., & Whitehead, M. (1991). Policies and strategies to promote social equity in health. *Stockholm: Institute for Future Studies*, 1–69.

Dahlgren, G., Whitehead, M., & World Health Organization. Regional Office for Europe. (2006). *Levelling up (part 2): A discussion paper on European strategies for tackling social inequities in health / by Göran Dahlgren and Margaret WHitehead*. *EUR/06/5062295*. WHO IRIS. https://apps.who.int/iris/handle/10665/107791

Dawson, D. A., Grant, B. F., Stinson, F. S., & Zhou, Y. (2005). Effectiveness of the derived Alcohol Use Disorders Identification Test (AUDIT-C) in screening for alcohol use disorders and risk drinking in the US general population. *Alcoholism, Clinical and Experimental Research*, *29*(5), 844–854.

de Bruin, A. (1996). *Health Interview Surveys: Towards International Harmonization of Methods and Instruments. WHO Regional Publications, European Series, No. 58*. Office of Publications, WHO Regional Office for Europe, Scherfigsvej 8, DK-2100 Copenhagen 0, Denmark (39 Swiss francs). https://eric.ed.gov/?id=ED394961

De Luca, S. M., Franklin, C., Yueqi, Y., Johnson, S., & Brownson, C. (2016). The Relationship Between Suicide Ideation, Behavioral Health, and College Academic Performance. *Community Mental Health Journal*, *52*(5), 534–540. https://doi.org/10.1007/s10597-016-9987-4

De Silva, M. J., McKenzie, K., Harpham, T., & Huttly, S. R. A. (2005). Social capital and mental illness: A systematic review. *Journal of Epidemiology and Community Health*, *59*(8), 619–627. https://doi.org/10.1136/jech.2004.029678

Demartini, K. S., & Carey, K. B. (2012). Optimizing the use of the AUDIT for alcohol screening in college students. *Psychological Assessment*, *24*(4), 954–963. https://doi.org/10.1037/a0028519

Derose, K. P., & Varda, D. M. (2009). Social capital and health care access: A systematic review. *Medical Care Research and Review: MCRR*, *66*(3), 272–306. https://doi.org/10.1177/1077558708330428

Detrie, P. M., & Lease, S. H. (2007). The relation of social support, connectedness, and collective self-esteem to the psychological well-being of lesbian, gay, and bisexual youth. *Journal of Homosexuality*, *53*(4), 173–199. https://doi.org/10.1080/00918360802103449

di Giacomo, E., Krausz, M., Colmegna, F., Aspesi, F., & Clerici, M. (2018). Estimating the Risk of Attempted Suicide Among Sexual Minority Youths: A Systematic Review and Meta-analysis. *JAMA Pediatrics*, *172*(12), 1145–1152. https://doi.org/10.1001/jamapediatrics.2018.2731

Doniec, K., Dall'Alba, R., & King, L. (2018). Brazil's health catastrophe in the making. *The Lancet*, *392*(10149), 731–732. https://doi.org/10.1016/S0140-6736(18)30853-5

Duggan, M., & Brenner, J. (2013). *The demographics of social media users, 2012* (Vol. 14). Pew Research Center's Internet & American Life Project Washington, DC.

Durkheim, É. (1897). *Le Suicide*. http://archive.org/details/DurkheimmileLeSuicide1897

Dworkin, R. H., Turk, D. C., McDermott, M. P., Peirce-Sandner, S., Burke, L. B., Cowan, P., Farrar, J. T., Hertz, S., Raja, S. N., Rappaport, B. A., Rauschkolb, C., & Sampaio, C. (2009). Interpreting the clinical importance of group differences in chronic pain

clinical trials: IMMPACT recommendations. *Pain*, *146*(3), 238–244. https://doi.org/10.1016/j.pain.2009.08.019

Džubur, A., Abdulahović, D., Kurspahić-Mujčić, A., Džubur, A., Loga-Zec, S., & Škrijelj, V. (2018). Depressive Symptoms Among Sarajevo University Students: Prevalence and Socio-Demographic Correlations. *Acta Medica Academica*, *47*(2), 155–164. https://doi.org/10.5644/ama2006-124.227

Eadie, E. M., Runtz, M. G., & Spencer-Rodgers, J. (2008). Posttraumatic stress symptoms as a mediator between sexual assault and adverse health outcomes in undergraduate women. *Journal of Traumatic Stress*, *21*(6), 540–547. https://doi.org/10.1002/jts.20369

Economou, M., Madianos, M., Peppou, L. E., Patelakis, A., & Stefanis, C. N. (2013). Major depression in the era of economic crisis: A replication of a cross-sectional study across Greece. *Journal of Affective Disorders*, *145*(3), 308–314. https://doi.org/10.1016/j.jad.2012.08.008

Egan, K., Stolzenberg, E. B., Zimmerman, H. B., Aragon, M. C., Whang Sayson, H., & Rios-Aguilar, C. (2017). *The American freshman: National norms fall 2016*. Higher Education Research Institute, UCLA. https://www.heri.ucla.edu/monographs/TheAmericanFreshman2016.pdf

Eisenberg, M. E., Lust, K., Mathiason, M. A., & Porta, C. M. (2017). Sexual Assault, Sexual Orientation, and Reporting Among College Students. *Journal of Interpersonal Violence*, 886260517726414. https://doi.org/10.1177/0886260517726414

Eisenberg, M. E., & Resnick, M. D. (2006). Suicidality among Gay, Lesbian and Bisexual Youth: The Role of Protective Factors. *Journal of Adolescent Health*, *39*(5), 662–668. https://doi.org/10.1016/j.jadohealth.2006.04.024

Eriksson, M. (2010). *Social Capital, Health and Community Action*. 105.

Eriksson, M., Dahlgren, L., Janlert, U., Weinehall, L., & Emmelin, M. (2010). Social Capital, Gender and Educational Level Impact on Self-Rated Health. *The Open Public Health Journal*, *3*(1). https://benthamopen.com/ABSTRACT/TOPHJ-3-1

Espelage, D. L., Basile, K. C., & Hamburger, M. E. (2012). Bullying perpetration and subsequent sexual violence perpetration among middle school students. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, *50*(1), 60–65. https://doi.org/10.1016/j.jadohealth.2011.07.015

Everett, B. G. (2014). Changes in Neighborhood Characteristics and Depression Among Sexual Minority Young Adults. *Journal of the American Psychiatric Nurses Association*, *20*(1), 42–52. https://doi.org/10.1177/1078390313510319

Faller, H., & Lang, H. (2010). Bezugssysteme von Gesundheit und Krankheit. In H. Faller & H. Lang (Eds.), *Medizinische Psychologie und Soziologie* (pp. 3–13). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-12584-3_1

Ferlatte, O., Salway, T., Rice, S. M., Oliffe, J. L., Knight, R., & Ogrodniczuk, J. S. (2019). Inequities in depression within a population of sexual and gender minorities. *Journal of Mental Health (Abingdon, England)*, 1–8. https://doi.org/10.1080/09638237.2019.1581345

Fincham, F. D., & Cui, M. (2010, October). *Emerging Adulthood and Romantic Relationships: An Introduction*. Romantic Relationships in Emerging Adulthood. https://doi.org/10.1017/CBO9780511761935.002

Fiorillo, D., Lavadera, G. L., & Nappo, N. (2017). Social participation and self-rated psychological health: A longitudinal study on BHPS. *SSM - Population Health*, *3*, 266–274. https://doi.org/10.1016/j.ssmph.2017.02.003

Fisher, L. B., Overholser, J. C., Ridley, J., Braden, A., & Rosoff, C. (2015). From the Outside Looking In: Sense of Belonging, Depression, and Suicide Risk. *Psychiatry*, *78*(1), 29–41. https://doi.org/10.1080/00332747.2015.1015867

Forsman, A. K., Nyqvist, F., Schierenbeck, I., Gustafson, Y., & Wahlbeck, K. (2012). Structural and cognitive social capital and depression among older adults in two Nordic regions. *Aging & Mental Health*, *16*(6), 771–779. https://doi.org/10.1080/13607863.2012.667784

Fujiwara, T., & Kawachi, I. (2008). A prospective study of individual-level social capital and major depression in the United States. *Journal of Epidemiology and Community Health*, *62*(7), 627–633. https://doi.org/10.1136/jech.2007.064261

Galliher, R. V., Rostosky, S. S., & Hughes, H. K. (2004). School Belonging, Self-Esteem, and Depressive Symptoms in Adolescents: An Examination of Sex, Sexual Attraction Status, and Urbanicity. *Journal of Youth and Adolescence*, *33*(3), 235–245. https://doi.org/10.1023/B:JOYO.0000025322.11510.9d

Garett, R., Liu, S., & Young, S. D. (2017). A Longitudinal Analysis of Stress Among Incoming College Freshman. *Journal of American College Health : J of ACH*, *65*(5), 331–338. https://doi.org/10.1080/07448481.2017.1312413

Geisner, I. M., Mallett, K., & Kilmer, J. R. (2012). An Examination of Depressive Symptoms and Drinking Patterns in First Year College Students. *Issues in Mental Health Nursing*, *33*(5). https://doi.org/10.3109/01612840.2011.653036

Gold, S. D., Marx, B. P., & Lexington, J. M. (2007). Gay male sexual assault survivors: The relations among internalized homophobia, experiential avoidance, and psychological symptom severity. *Behaviour Research and Therapy*, *45*(3), 549–562. https://doi.org/10.1016/j.brat.2006.05.006

Green, K. L., Brown, G. K., Jager-Hyman, S., Cha, J., Steer, R. A., & Beck, A. T. (2015). The Predictive Validity of the Beck Depression Inventory Suicide Item. *The Journal of Clinical Psychiatry*, *76*(12), 1683–1686. https://doi.org/10.4088/JCP.14m09391

Greene, B. (1998). Sexual Orientation. In A. S. Bellack & M. Hersen (Eds.), *Comprehensive Clinical Psychology* (pp. 207–232). Pergamon. https://doi.org/10.1016/B0080-4270(73)00110-3

Grigera, J., Webber, J. R., Abilio, L., Antunes, R., Mattos, M. B., Fernandes, S., Nunes, R., Paulani, L., & Purdy, S. (2019). The Long Brazilian Crisis: A Forum. *Historical Materialism*, *27*(2), 59–121. https://doi.org/10.1163/1569206x-00001869

Grootaert, C., Narayan, D., Nyhan Jones, V., & Woolcock, M. (2004). *Measuring Social Capital: An Integrated Questionnaire*. The World Bank.

http://documents.worldbank.org/curated/en/515261468740392133/pdf/281100PAPER0Measuring0social0capital.pdf

Grootaert, C., & van Bastelaer, T. (2001). *Understanding and measuring social capital.* 45.

Gummadam, P., Pittman, L. D., & Ioffe, M. (2016). School Belonging, Ethnic Identity, and Psychological Adjustment Among Ethnic Minority College Students. *The Journal of Experimental Education*, *84*(2), 289–306. https://doi.org/10.1080/00220973.2015.1048844

Hagerty, B. M. K., Lynch-Sauer, J., Patusky, K. L., Bouwsema, M., & Collier, P. (1992). Sense of belonging: A vital mental health concept. *Archives of Psychiatric Nursing*, *6*(3), 172–177. https://doi.org/10.1016/0883-9417(92)90028-H

Hagströmer, M., Oja, P., & Sjöström, M. (2006). The International Physical Activity Questionnaire (IPAQ): A study of concurrent and construct validity. *Public Health Nutrition*, *9*(6), 755–762.

Hall, L. A., Peden, A. R., Rayens, M. K., & Beebe, L. H. (2004). Parental bonding: A key factor for mental health of college women. *Issues in Mental Health Nursing*, *25*(3), 277–291.

Halpern, D. (2005). *Social Capital*. Polity.

Harpham, T. (2008). The Measurement of Community Social Capital Through Surveys. In Ichiro Kawachi, S. V. Subramanian, & D. Kim (Eds.), *Social Capital and Health* (pp. 51–62). Springer New York. https://doi.org/10.1007/978-0-387-71311-3_3

Haseda, M., Kondo, N., Takagi, D., & Kondo, K. (2018). Community social capital and inequality in depressive symptoms among older Japanese adults: A multilevel study. *Health & Place*, *52*, 8–17. https://doi.org/10.1016/j.healthplace.2018.04.010

Häuberer, J. (2011). The Founding Concepts of Social Capital—Bourdieu's Theory of Capital and Coleman's Rational-Choice Approach to Social Capital. In J. Häuberer (Ed.), *Social Capital Theory: Towards a Methodological Foundation* (pp. 35–51). VS Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-531-92646-9_2

Heffer, T., & Willoughby, T. (2017). A count of coping strategies: A longitudinal study investigating an alternative method to understanding coping and adjustment. *PLoS ONE*, *12*(10). https://doi.org/10.1371/journal.pone.0186057

Helliwell, J. F. (2004). *Well-Being and Social Capital: Does Suicide Pose a Puzzle?* (Working Paper No. 10896). National Bureau of Economic Research. https://doi.org/10.3386/w10896

Hendryx, M. S., Ahern, M. M., Lovrich, N. P., & McCurdy, A. H. (2002). Access to Health Care and Community Social Capital. *Health Services Research*, *37*(1), 85–101. https://doi.org/10.1111/1475-6773.00111

Henriques, G. (2018). *The College Student Mental Health Crisis (Update)*. Psychology Today. https://www.psychologytoday.com/blog/theory-knowledge/201811/the-college-student-mental-health-crisis-update

Hom, M. A., Joiner, T. E., & Bernert, R. A. (2016). Limitations of a single-item assessment of suicide attempt history: Implications for standardized suicide risk assessment. *Psychological Assessment*, *28*(8), 1026–1030. https://doi.org/10.1037/pas0000241

Hottes, T. S., Bogaert, L., Rhodes, A. E., Brennan, D. J., & Gesink, D. (2016). Lifetime Prevalence of Suicide Attempts Among Sexual Minority Adults by Study Sampling

Strategies: A Systematic Review and Meta-Analysis. *American Journal of Public Health*, *106*(5), e1–e12. https://doi.org/10.2105/AJPH.2016.303088

Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research*, *47*(3), 391–400. https://doi.org/10.1016/j.jpsychires.2012.11.015

Ibrahim, A. K., Kelly, S. J., & Glazebrook, C. (2013). Socioeconomic status and the risk of depression among U.K. higher education students. *Social Psychiatry and Psychiatric Epidemiology*, *48*(9), 1491–1501. https://doi.org/10.1007/s00127-013-0663-5

Istituto nazionale di statistica. (2016). *bes 216—Il benessere equo e sostenibile in Italia*. https://www.istat.it/it/files/2016/12/BES-2016.pdf

Johnson, C. M., Sharkey, J. R., & Dean, W. R. (2010). Eating Behaviors and Social Capital are Associated with Fruit and Vegetable Intake Among Rural Adults. *Journal of Hunger & Environmental Nutrition*, *5*(3), 302–315. https://doi.org/10.1080/19320248.2010.504094

Joiner, T. E. (2005). *Why People Die by Suicide*. Harvard University Press. http://www.hup.harvard.edu/catalog.php?isbn=9780674025493

Karadoğan, D., Önal, Ö., & Kanbay, Y. (2018). Prevalence and determinants of smoking status among university students: Artvin Çoruh University sample. *PloS One*, *13*(12), e0200671. https://doi.org/10.1371/journal.pone.0200671

Kawachi, I., & Berkman, L. F. (2001). Social ties and mental health. *Journal of Urban Health*, *78*(3), 458–467. https://doi.org/10.1093/jurban/78.3.458

Kawachi, I., Kennedy, B. P., & Glass, R. (1999). Social capital and self-rated health: A contextual analysis. *American Journal of Public Health*, *89*(8), 1187–1193. https://doi.org/10.2105/ajph.89.8.1187

Kawachi, I, Kennedy, B. P., Lochner, K., & Prothrow-Stith, D. (1997). Social capital, income inequality, and mortality. *American Journal of Public Health*, *87*(9), 1491–1498.

Kawachi, I., Subramanian, S. V., & Kim, D. (2008). Social Capital and Health. In *Social Capital and Health* (pp. 1–26). Springer, New York, NY. https://doi.org/10.1007/978-0-387-71311-3_1

Keeley, B. (2007). *Human Capital*. https://www.oecd-ilibrary.org/content/publication/9789264029095-en

Kern, A., Hong, V., Song, J., Lipson, S. K., & Eisenberg, D. (2018). Mental health apps in a college setting: Openness, usage, and attitudes. *MHealth*, *4*. https://doi.org/10.21037/mhealth.2018.06.01

Ketchen Lipson, S., Gaddis, S. M., Heinze, J., Beck, K., & Eisenberg, D. (2015). Variations in Student Mental Health and Treatment Utilization Across US Colleges and Universities. *Journal of American College Health: J of ACH*, *63*(6), 388–396. https://doi.org/10.1080/07448481.2015.1040411

Khadr, S., Clarke, V., Wellings, K., Villalta, L., Goddard, A., Welch, J., Bewley, S., Kramer, T., & Viner, R. (2018). Mental and sexual health outcomes following sexual assault in adolescents: A prospective cohort study. *The Lancet. Child & Adolescent Health*, *2*(9), 654–665. https://doi.org/10.1016/S2352-4642(18)30202-5

Klemenc-Ketis, Z., Kersnik, J., Eder, K., & Colaric, D. (2011). Factors associated with health-related quality of life among university students. *Srpski Arhiv Za Celokupno Lekarstvo*, *139*(3–4), 197–202.

Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox. A social technology that reduces social involvement and psychological well-being? *The American Psychologist*, *53*(9), 1017–1031.

Krieger, H., Young, C. M., Anthenien, A. M., & Neighbors, C. (2018). The Epidemiology of Binge Drinking Among College-Age Individuals in the United States. *Alcohol Research : Current Reviews*, *39*(1), 23–30.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606–613.

Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D. S., Lin, N., Shablack, H., Jonides, J., & Ybarra, O. (2013). Facebook Use Predicts Declines in Subjective Well-Being in Young Adults. *PLOS ONE*, *8*(8), e69841. https://doi.org/10.1371/journal.pone.0069841

Kwan, M. Y., Arbour-Nicitopoulos, K. P., Duku, E., & Faulkner, G. (2016). Patterns of multiple health risk–behaviours in university students and their association with mental health: Application of latent class analysis. *Health Promotion and Chronic Disease Prevention in Canada : Research, Policy and Practice*, *36*(8), 163–170.

Kypri, K., Cronin, M., & Wright, C. S. (2005). Do university students drink more hazardously than their non-student peers? *Addiction (Abingdon, England)*, *100*(5), 713–714. https://doi.org/10.1111/j.1360-0443.2005.01116.x

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1997). Trust in Large Organizations. *The American Economic Review*, *87*(2), 333–338.

Leiderman, E. A., Lolich, M., Vázquez, G. H., & Baldessarini, R. J. (2012). Depression: Point-prevalence and sociodemographic correlates in a Buenos Aires community sample. *Journal of Affective Disorders*, *136*(3), 1154–1158. https://doi.org/10.1016/j.jad.2011.09.032

Levis, B., Benedetti, A., & Thombs, B. D. (2019). Accuracy of Patient Health Questionnaire-9 (PHQ-9) for screening to detect major depression: Individual participant data meta-analysis. *BMJ*, *365*, l1476. https://doi.org/10.1136/bmj.l1476

Lilly, M. M., Valdez, C. E., & Graham-Bermann, S. A. (2011). The mediating effect of world assumptions on the relationship between trauma exposure and depression. *Journal of Interpersonal Violence*, *26*(12), 2499–2516. https://doi.org/10.1177/0886260510383033

Lipson, S. K., Kern, A., Eisenberg, D., & Breland-Noble, A. M. (2018). Mental Health Disparities Among College Students of Color. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, *63*(3), 348–356. https://doi.org/10.1016/j.jadohealth.2018.04.014

Lipson, S. K., Lattie, E. G., & Eisenberg, D. (2019). Increased Rates of Mental Health Service Utilization by U.S. College Students: 10-Year Population-Level Trends (2007-2017). *Psychiatric Services (Washington, D.C.)*, *70*(1), 60–63. https://doi.org/10.1176/appi.ps.201800332

Lipson, S. K., Raifman, J., Abelson, S., & Reisner, S. L. (2019). Gender Minority Mental Health in the U.S.: Results of a National Survey on College Campuses. *American Journal of Preventive Medicine*, *57*(3), 293–301. https://doi.org/10.1016/j.amepre.2019.04.025

Lockman, J. D., & Servaty-Seib, H. L. (2016). College student suicidal ideation: Perceived burdensomeness, thwarted belongingness, and meaning made of stress. *Death Studies*, *40*(3), 154–164. https://doi.org/10.1080/07481187.2015.1105325

Macinko, J., & Starfield, B. (2001). The utility of social capital in research on health determinants. *The Milbank Quarterly*, *79*(3), 387–427, IV.

Marmot, M. (2014). Commentary: Mental health and public health. *International Journal of Epidemiology*, *43*(2), 293–296. https://doi.org/10.1093/ije/dyu054

Marmot, M. (2017). Social justice, epidemiology and health inequalities. *European Journal of Epidemiology*, *32*(7), 537–546. https://doi.org/10.1007/s10654-017-0286-3

Marmot, M., Bosma, H., Hemingway, H., Brunner, E., & Stansfeld, S. (1997). Contribution of job control and other risk factors to social variations in coronary heart disease incidence. *Lancet (London, England)*, *350*(9073), 235–239.

McGrath, R. E., Mitchell, M., Kim, B. H., & Hough, L. (2010). Evidence for response bias as a source of error variance in applied assessment. *Psychological Bulletin*, *136*(3), 450–470. https://doi.org/10.1037/a0019216

McKenzie, K., & Harpham, T. (2006). *Social Capital and Mental Health*. Jessica Kingsley Publishers.

McPherson, K. E., Kerr, S., McGee, E., Morgan, A., Cheater, F. M., McLean, J., & Egan, J. (2014). The association between social capital and mental health and behavioural problems in children and adolescents: An integrative systematic review. *BMC Psychology*, *2*(1), 7. https://doi.org/10.1186/2050-7283-2-7

Meier, G. M. (2002). Culture, Social Capital, and Management in a Developing Economy. *Zagreb International Review of Economics and Business*, *5*(1), 1–15.

Merlo, J., Chaix, B., Yang, M., Lynch, J., & Råstam, L. (2005). A brief conceptual tutorial of multilevel analysis in social epidemiology: Linking the statistical concept of clustering to the idea of contextual phenomenon. *Journal of Epidemiology & Community Health*, *59*(6), 443–449. https://doi.org/10.1136/jech.2004.023473

Meyer, I. H. (2003). Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations: Conceptual Issues and Research Evidence. *Psychological Bulletin*, *129*(5), 674–697. https://doi.org/10.1037/0033-2909.129.5.674

Michalos, A. C. (Ed.). (2014). SF-12v2. In *Encyclopedia of Quality of Life and Well-Being Research* (pp. 5938–5938). Springer Netherlands. https://doi.org/10.1007/978-94-007-0753-5_103826

Mikolajczyk, R. T., Brzoska, P., Maier, C., Ottova, V., Meier, S., Dudziak, U., Ilieva, S., & El Ansari, W. (2008). Factors associated with self-rated health status in university students: A cross-sectional study in three European countries. BMC Public Health, 8, 215. https://doi.org/10.1186/1471-2458-8-215

Ministério da Educação. (2018). *Censo da Educação Superior—INEP*. http://portal.inep.gov.br/web/guest/censo-da-educacao-superior

Ministério da Educação. (2019). *Fundo de Financiamento ao Estudante de ensino superior*. http://sisfiesportal.mec.gov.br/?pagina=fies

Mitchell, A. D., & Bossert, T. J. (2007). Measuring dimensions of social capital: Evidence from surveys in poor communities in Nicaragua. *Social Science & Medicine (1982)*, *64*(1), 50–63. https://doi.org/10.1016/j.socscimed.2006.08.021

Moran, S., Wechsler, H., & Rigotti, N. A. (2004). Social Smoking Among US College Students. *Pediatrics*, *114*(4), 1028–1034. https://doi.org/10.1542/peds.2003-0558-L

Mortenson, S. T. (2009). Interpersonal Trust and Social Skill in Seeking Social Support Among Chinese and Americans. *Communication Research*, *36*(1), 32–53. https://doi.org/10.1177/0093650208326460

Murayama, H., Fujiwara, Y., & Kawachi, I. (2012). Social Capital and Health: A Review of Prospective Multilevel Studies. *Journal of Epidemiology*, *22*(3), 179–187. https://doi.org/10.2188/jea.JE20110128

Ngin, C., Pal, K., Tuot, S., Chhoun, P., Yi, R., & Yi, S. (2018). Social and behavioural factors associated with depressive symptoms among university students in Cambodia: A cross-sectional study. *BMJ Open*, *8*(9). https://doi.org/10.1136/bmjopen-2017-019918

Nollett, C., Ryan, B., Bray, N., Bunce, C., Casten, R., Edwards, R. T., Gillespie, D., Smith, D. J., Stanford, M., & Margrain, T. H. (2019). Depressive symptoms in people with vision impairment: A cross-sectional study to identify who is most at risk. *BMJ Open*, *9*(1), e026163–e026163. PubMed. https://doi.org/10.1136/bmjopen-2018-026163

Novak, D., Emeljanovas, A., Mieziene, B., Štefan, L., & Kawachi, I. (2018). How different contexts of social capital are associated with self-rated health among Lithuanian high-school students. *Global Health Action*, *11*(1), 1477470. https://doi.org/10.1080/16549716.2018.1477470

Novak, D., Štefan, L., Emeljanovas, A., Mieziene, B., Milanović, I., Janić, S. R., & Kawachi, I. (2017). Factors associated with good self-rated health in European adolescents: A population-based cross-sectional study. *International Journal of Public Health*, *62*(9), 971–979. https://doi.org/10.1007/s00038-017-1015-0

Nuttman-Shwartz, O., & Dekel, R. (2009). Ways of coping and sense of belonging in the face of a continuous threat. *Journal of Traumatic Stress*, *22*(6), 667–670. https://doi.org/10.1002/jts.20463

Nyqvist, F. (2009). *Social capital and health: Variations, associations and challenges*. Painosalama.

Ogunsanya, M. E., Bamgbade, B. A., Thach, A. V., Sudhapalli, P., & Rascati, K. L. (2018). Determinants of health-related quality of life in international graduate students. *Currents in Pharmacy Teaching & Learning*, *10*(4), 413–422. https://doi.org/10.1016/j.cptl.2017.12.005

Oswalt, S. B., & Wyatt, T. J. (2011). Sexual Orientation and Differences in Mental Health, Stress, and Academic Performance in a National Sample of U.S. College Students.

Journal of Homosexuality, *58*(9), 1255–1280. https://doi.org/10.1080/00918369.2011.605738

Pakula, B., Carpiano, R. M., Ratner, P. A., & Shoveller, J. A. (2016). Life stress as a mediator and community belonging as a moderator of mood and anxiety disorders and co-occurring disorders with heavy drinking of gay, lesbian, bisexual, and heterosexual Canadians. *Social Psychiatry and Psychiatric Epidemiology*, *51*(8), 1181–1192. https://doi.org/10.1007/s00127-016-1236-1

Park, S., Ahn, J., & Lee, B.-K. (2015). Self-rated Subjective Health Status Is Strongly Associated with Sociodemographic Factors, Lifestyle, Nutrient Intakes, and Biochemical Indices, but Not Smoking Status: KNHANES 2007-2012. *Journal of Korean Medical Science*, *30*(9), 1279–1287. https://doi.org/10.3346/jkms.2015.30.9.1279

Pedrelli, P., Nyer, M., Yeung, A., Zulauf, C., & Wilens, T. (2015). College Students: Mental Health Problems and Treatment Considerations. *Academic Psychiatry : The Journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry*, *39*(5), 503–511. https://doi.org/10.1007/s40596-014-0205-9

Pedrelli, P., Shapero, B., Archibald, A., & Dale, C. (2016). Alcohol use and depression during adolescence and young adulthood: A summary and interpretation of mixed findings. *Current Addiction Reports*, *3*(1), 91–97. https://doi.org/10.1007/s40429-016-0084-0

Pedrelli, P., Shyu, I., Baer, L., Guidi, J., Tucker, D. D., Vitali, M., Fava, M., Zisook, S., & Farabaugh, A. H. (2011). Compulsive alcohol use and other high-risk behaviors among college students. *The American Journal on Addictions*, *20*(1), 14–20. https://doi.org/10.1111/j.1521-0391.2010.00090.x

Perrin, A., & Anderson, M. (2019). Share of U.S. adults using social media, including Facebook, is mostly unchanged since 2018. *Pew Research Center*. https://www.pewresearch.org/fact-tank/2019/04/10/share-of-u-s-adults-using-social-media-including-facebook-is-mostly-unchanged-since-2018/

Pilika, A., & Simaku, A. (2017). Depression, anxiety and stress symptoms among students in Albania explored by DASS-42. *European Psychiatry*, *41*, S412. https://doi.org/10.1016/j.eurpsy.2017.01.352

Pisani, A. R., Schmeelk-Cone, K., Gunzler, D., Petrova, M., Goldston, D. B., Tu, X., & Wyman, P. A. (2012). Associations between suicidal high school students' help-seeking and their attitudes and perceptions of social environment. *Journal of Youth and Adolescence*, *41*(10), 1312–1324. https://doi.org/10.1007/s10964-012-9766-7

Portes, A. (1996). Unsolved Mysteries: The Tocqueville Files II. *The American Prospect*. https://prospect.org/article/unsolved-mysteries-tocqueville-files-ii-1

Portes, A. (1998). Social Capital: Its Origins and Applications in Modern Sociology. *Annual Review of Sociology*, *24*(1), 1–24. https://doi.org/10.1146/annurev.soc.24.1.1

Portes, A., & Landolt, P. (2000). Social Capital: Promise and Pitfalls of Its Role in Development. *Journal of Latin American Studies*, *32*(2), 529–547. JSTOR.

Pratt, L. A., & Brody, D. J. (2014). Depression in the U.S. household population, 2009-2012. *NCHS Data Brief*, *172*, 1–8.

Putnam, R. D. (1995). Bowling Alone: America's Declining Social Capital. *Journal of Democracy*, *6*(1), 65–78. https://doi.org/10.1353/jod.1995.0002

Putnam, R. D. (2000). Bowling Alone: America's Declining Social Capital. In L. Crothers & C. Lockhart (Eds.), *Culture and Politics: A Reader* (pp. 223–234). Palgrave Macmillan US. https://doi.org/10.1007/978-1-349-62397-6_12

Putnam, R. D. (2001). *Bowling Alone: The Collapse and Revival of American Community*. Simon and Schuster.

Rajagopal, S. (2004). Suicide pacts and the internet. *BMJ : British Medical Journal*, *329*(7478), 1298–1299.

Rebar, A. L., Stanton, R., Geard, D., Short, C., Duncan, M. J., & Vandelanotte, C. (2015). A meta-meta-analysis of the effect of physical activity on depression and anxiety in non-clinical adult populations. *Health Psychology Review*, *9*(3), 366–378. https://doi.org/10.1080/17437199.2015.1022901

Richardson, T., Elliott, P., Roberts, R., & Jansen, M. (2017). A Longitudinal Study of Financial Difficulties and Mental Health in a National Sample of British Undergraduate Students. *Community Mental Health Journal*, *53*(3), 344–352. https://doi.org/10.1007/s10597-016-0052-0

Rohrer, J. E., Cole, L. J., & Schulze, F. W. (2012). Cigarettes and self-rated health among online university students. *Journal of Immigrant and Minority Health*, *14*(3), 502–505. https://doi.org/10.1007/s10903-011-9564-4

Rosellini, A. J., Street, A. E., Ursano, R. J., Chiu, W. T., Heeringa, S. G., Monahan, J., Naifeh, J. A., Petukhova, M. V., Reis, B. Y., Sampson, N. A., Bliese, P. D., Stein, M. B., Zaslavsky, A. M., & Kessler, R. C. (2017). Sexual Assault Victimization and Mental Health Treatment, Suicide Attempts, and Career Outcomes Among Women in the US Army. *American Journal of Public Health*, *107*(5), 732–739. https://doi.org/10.2105/AJPH.2017.303693

Rosen, L. D., Whaling, K., Rab, S., Carrier, L. M., & Cheever, N. A. (2013). Is Facebook creating "iDisorders"? The link between clinical symptoms of psychiatric disorders and technology use, attitudes and anxiety. *Computers in Human Behavior*, *29*(3), 1243–1254. https://doi.org/10.1016/j.chb.2012.11.012

Rosenthal, J. M., & Okie, S. (2005). White coat, mood indigo—Depression in medical school. *The New England Journal of Medicine*, *353*(11), 1085–1088. https://doi.org/10.1056/NEJMp058183

Rossom, R. C., Coleman, K. J., Ahmedani, B. K., Beck, A., Johnson, E., Oliver, M., & Simon, G. E. (2017). Suicidal Ideation Reported on the PHQ9 and Risk of Suicidal Behavior across Age Groups. *Journal of Affective Disorders*, *215*, 77–84. https://doi.org/10.1016/j.jad.2017.03.037

Rostila, M. (2008). *Healthy bridges: Studies of social capital, welfare, and health* [PhD Thesis]. Stockholm University, Centre for Health Equity Studies (CHESS).

Rumpf, H.-J., Hapke, U., Meyer, C., & John, U. (2002). Screening for alcohol use disorders and at-risk drinking in the general population: Psychometric performance of three

questionnaires. *Alcohol and Alcoholism (Oxford, Oxfordshire)*, *37*(3), 261–268. https://doi.org/10.1093/alcalc/37.3.261

Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption--II. *Addiction (Abingdon, England)*, *88*(6), 791–804.

Schaefer-McDaniel, N. J. (2004). Conceptualizing Social Capital among Young People: Towards a New Theory. *Children, Youth and Environments*, *14*(1), 153–172.

Schmitt, M., Altstötter-Gleich, C., Hinz, A., Maes, J., & Brähler, E. (2006). Normwerte für das Vereinfachte Beck-Depressions-Inventar (BDI-V) in der Allgemeinbevölkerung. *Diagnostica*, *52*(2), 51–59. https://doi.org/10.1026/0012-1924.52.2.51

Schmitt, M., Beckmann, M., Dusi, D., Maes, J., Schiller, A., & Schonauer, K. (2003). Messgüte des vereinfachten Beck-Depressions-Inventars (BDI-V). *Diagnostica*, *49*(4), 147–156. https://doi.org/10.1026//0012-1924.49.4.147

Schmitt, M., & Maes, J. (2000). Vorschlag zur Vereinfachung des Beck-Depressions-Inventars (BDI). *Diagnostica*, *46*(1), 38–46. https://doi.org/10.1026//0012-1924.46.1.38

Schneider, M. S., & Dimito, A. (2010). Factors influencing the career and academic choices of lesbian, gay, bisexual, and transgender people. *Journal of Homosexuality*, *57*(10), 1355–1369. https://doi.org/10.1080/00918369.2010.517080

Schofield, M. J., O'Halloran, P., McLean, S. A., Forrester-Knauss, C., & Paxton, S. J. (2016). Depressive Symptoms Among Australian University Students: Who Is at Risk? *Australian Psychologist*, *51*(2), 135–144. https://doi.org/10.1111/ap.12129

Seo, Y., & Je, Y. (2018). Disturbed eating tendencies, health-related behaviors, and depressive symptoms among university students in Korea. *Clinical Nutrition Experimental*, *19*, 23–31. https://doi.org/10.1016/j.yclnex.2018.02.001

Seth, P., Glenshaw, M., Sabatier, J. H. F., Adams, R., Du Preez, V., DeLuca, N., & Bock, N. (2015). AUDIT, AUDIT-C, and AUDIT-3: Drinking Patterns and Screening for Harmful, Hazardous and Dependent Drinking in Katutura, Namibia. *PLoS ONE*, *10*(3). https://doi.org/10.1371/journal.pone.0120850

Shaw, L. H., & Gant, L. M. (2002). In defense of the internet: The relationship between Internet communication and depression, loneliness, self-esteem, and perceived social support. *Cyberpsychology & Behavior: The Impact of the Internet, Multimedia and Virtual Reality on Behavior and Society*, *5*(2), 157–171. https://doi.org/10.1089/109493102753770552

Silva, M. T., Galvao, T. F., Martins, S. S., Pereira, M. G., Silva, M. T., Galvao, T. F., Martins, S. S., & Pereira, M. G. (2014). Prevalence of depression morbidity among Brazilian adults: A systematic review and meta-analysis. *Revista Brasileira de Psiquiatria*, *36*(3), 262–270. https://doi.org/10.1590/1516-4446-2013-1294

Silverschanz, P., Cortina, L. M., Konik, J., & Magley, V. J. (2008). Slurs, Snubs, and Queer Jokes: Incidence and Impact of Heterosexist Harassment in Academia. *Sex Roles*, *58*(3), 179–191. https://doi.org/10.1007/s11199-007-9329-7

Sims, S. (2019). *Brazil's Jair Bolsanaro slashes funding to scientists. The planet may suffer.* https://www.nationalgeographic.com/environment/2019/04/brazil-cuts-funding-scientists-grad-students-environment-suffers/

Slutske, W. S. (2005). Alcohol Use Disorders Among US College Students and Their Non–College-Attending Peers. *Archives of General Psychiatry*, *62*(3), 321–327. https://doi.org/10.1001/archpsyc.62.3.321

Smart, A. (2008). Social Capital. *Anthropologica*, *50*(2), 409–416. JSTOR.

Sommet, A., Ferrières, N., Jaoul, V., Cadieux, L., Soulat, J.-M., Lapeyre-Mestre, M., & Montastruc, J.-L. (2012). Use of drugs, tobacco, alcohol and illicit substances in a French student population. *Therapie*, *67*(5), 429–435. https://doi.org/10.2515/therapie/2012056

Stallman, H. M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist*, *45*(4), 249–257. https://doi.org/10.1080/00050067.2010.482109

Statista. (2019). *Number of social media users worldwide 2010-2021*. https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/

Steptoe, A., Tsuda, A., Tanaka, Y., & Wardle, J. (2007). Depressive symptoms, socio-economic background, sense of control, and cultural factors in university students from 23 countries. *International Journal of Behavioral Medicine*, *14*(2), 97–107.

Stewart-Brown, S., Evans, J., Patterson, J., Petersen, S., Doll, H., Balding, J., & Regis, D. (2000). The health of students in institutes of higher education: An important and neglected public health problem? *Journal of Public Health Medicine*, *22*(4), 492–499.

Stone, A. A., & Shiffman, S. (2002). Capturing momentary, self-report data: A proposal for reporting guidelines. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, *24*(3), 236–243. https://doi.org/10.1207/S15324796ABM2403_09

Subramanian, S. V., Lochner, K. A., & Kawachi, I. (2003). Neighborhood differences in social capital: A compositional artifact or a contextual construct? *Health & Place*, *9*(1), 33–44.

Taliaferro, L. A., Rienzo, B. A., Pigg, R. M., Miller, M. D., & Dodd, V. J. (2009). Associations between physical activity and reduced rates of hopelessness, depression, and suicidal behavior among college students. *Journal of American College Health: J of ACH*, *57*(4), 427–436. https://doi.org/10.3200/JACH.57.4.427-436

Tavits, M. (2008). Representation, Corruption, and Subjective Well-Being. *Comparative Political Studies*, *41*(12), 1607–1630. https://doi.org/10.1177/0010414007308537

The Fund for Peace. (2019). *Fragile States Index Annual Report 2019*. https://fragilestatesindex.org/wp-content/uploads/2019/03/9511904-fragilestatesindex.pdf

The Williams Institute. (2019). *LGBT Demographic Data Interactive*. https://williamsinstitute.law.ucla.edu/visualization/lgbt-stats/?topic=LGBT#about-the-data

Thomaidis, N. S., Gago-Ferrero, P., Ort, C., Maragou, N. C., Alygizakis, N. A., Borova, V. L., & Dasenaki, M. E. (2016). Reflection of Socioeconomic Changes in Wastewater: Licit and Illicit Drug Use Patterns. *Environmental Science & Technology*, *50*(18), 10065–10072. https://doi.org/10.1021/acs.est.6b02417

Thurston, R. C., Chang, Y., Matthews, K. A., von Känel, R., & Koenen, K. (2019). Association of Sexual Harassment and Sexual Assault With Midlife Women's Mental and Physical Health. *JAMA Internal Medicine*, *179*(1), 48–53. https://doi.org/10.1001/jamainternmed.2018.4886

Torgerson, C. N., Love, H. A., & Vennum, A. (2018). The buffering effect of belonging on the negative association of childhood trauma with adult mental health and risky alcohol use. *Journal of Substance Abuse Treatment*, *88*, 44–50. https://doi.org/10.1016/j.jsat.2018.02.005

Transparency International. (2019). *Corruption Perceptions Index 2018*. https://www.transparency.org/files/content/pages/CPI_2018_Executive_Summary_EN.pdf

Ueno, K. (2005). Sexual Orientation and Psychological Distress in Adolescence: Examining Interpersonal Stressors and Social Support Processes. *Social Psychology Quarterly*, *68*(3), 258–277. https://doi.org/10.1177/019027250506800305

Vaccaro, A., & Newman, B. M. (2017). A Sense of Belonging Through the Eyes of First-Year LGBPQ Students. *Journal of Student Affairs Research and Practice*, *54*(2), 137–149. https://doi.org/10.1080/19496591.2016.1211533

Vaez, M., Kristenson, M., & Laflamme, L. (2004). Perceived Quality of Life and Self-Rated Health among First-Year University Students: A Comparison with Their Working Peers. *Social Indicators Research*, *68*(2), 221–234. JSTOR.

Vaez, M., Voss, M., & Laflamme, L. (2010). Health-Related Quality of Life Among University Students. In V. R. Preedy & R. R. Watson (Eds.), *Handbook of Disease Burdens and Quality of Life Measures* (pp. 2555–2577). Springer New York. https://doi.org/10.1007/978-0-387-78665-0_149

Valente, T. W., Gallaher, P., & Mouttapa, M. (2004). Using social networks to understand and prevent substance use: A transdisciplinary perspective. *Substance Use & Misuse*, *39*(10–12), 1685–1712.

van Deurzen, I. (2017). And justice for all: Examining corruption as a contextual source of mental illness. *Social Science & Medicine (1982)*, *173*, 26–34. https://doi.org/10.1016/j.socscimed.2016.11.033

Van Orden, K. A., Witte, T. K., Gordon, K. H., Bender, T. W., & Joiner, T. E. (2008). Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological theory of suicidal behavior among adults. *Journal of Consulting and Clinical Psychology*, *76*(1), 72–83. https://doi.org/10.1037/0022-006X.76.1.72

Villalonga-Olives, E., Adams, I., & Kawachi, I. (2016). The development of a bridging social capital questionnaire for use in population health research. *SSM - Population Health*, *2*, 613–622. https://doi.org/10.1016/j.ssmph.2016.08.008

Villalonga-Olives, E., & Kawachi, I. (2017). The dark side of social capital: A systematic review of the negative health effects of social capital. *Social Science & Medicine*, *194*(Supplement C), 105–127. https://doi.org/10.1016/j.socscimed.2017.10.020

Vincens, N., Emmelin, M., & Stafström, M. (2018). Social capital, income inequality and the social gradient in self-rated health in Latin America: A fixed effects analysis. *Social Science & Medicine (1982)*, *196*, 115–122. https://doi.org/10.1016/j.socscimed.2017.11.025

Walls, N. E., Atteberry-Ash, B., Kattari, S. K., Peitzmeier, S., Kattari, L., & Langenderfer-Magruder, L. (2019). Gender Identity, Sexual Orientation, Mental Health, and Bullying as Predictors of Partner Violence in a Representative Sample of Youth. *Journal of Adolescent Health*, *64*(1), 86–92. https://doi.org/10.1016/j.jadohealth.2018.08.011

Walton, G. M., & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology*, *92*(1), 82–96. https://doi.org/10.1037/0022-3514.92.1.82

Wang, P., Xiong, Z., & Yang, H. (2018). Relationship of Mental Health, Social Support, and Coping Styles among Graduate Students: Evidence from Chinese Universities. *Iranian Journal of Public Health*, *47*(5), 689–697.

White Hughto, J. M., Murchison, G. R., Clark, K., Pachankis, J. E., & Reisner, S. L. (2016). Geographic and Individual Differences in Healthcare Access for U.S. Transgender Adults: A Multilevel Analysis. *LGBT Health*, *3*(6), 424–433. https://doi.org/10.1089/lgbt.2016.0044

WHO. (2019a). *Depression: Definition*. http://www.euro.who.int/en/health-topics/noncommunicable-diseases/pages/news/news/2012/10/depression-in-europe/depression-definition

WHO. (2019b). *Glossary of terms used*. WHO. https://www.who.int/hia/about/glos/en/index1.html

WHO. (2019c). *The determinants of health*. WHO. https://www.who.int/hia/evidence/doh/en/

Wilmot, N. A., & Dauner, K. N. (2019). A longitudinal examination of social capital as a predictor of depression. *Applied Economics Letters*, *26*(5), 424–428. https://doi.org/10.1080/13504851.2018.1486968

Winstanley, E. L., Steinwachs, D. M., Ensminger, M. E., Latkin, C. A., Stitzer, M. L., & Olsen, Y. (2008). The association of self-reported neighborhood disorganization and social capital with adolescent alcohol and drug use, dependence, and access to treatment. *Drug and Alcohol Dependence*, *92*(1–3), 173–182. https://doi.org/10.1016/j.drugalcdep.2007.07.012

Woodford, M. R., Kulick, A., Garvey, J. C., Sinco, B. R., & Hong, J. S. (2018). LGBTQ policies and resources on campus and the experiences and psychological well-being of sexual minority college students: Advancing research on structural inclusion. *Psychology of Sexual Orientation and Gender Diversity*, *5*(4), 445–456. https://doi.org/10.1037/sgd0000289

World Bank. (2018). *Overview Kosovo*. World Bank. https://www.worldbank.org/en/country/kosovo/overview

World Bank. (2019). *Gross domestic product 2018, World Development Indicators database*. World Bank. https://databank.worldbank.org/data/download/GDP.pdf

World Health Organization. (2017). *WHO | Depression and Other Common Mental Disorders*. http://www.who.int/mental_health/management/depression/prevalence_global_health_estimates/en/

World Health Organization. (2019). *Mental health: A state of well-being*. WHO. https://www.who.int/features/factfiles/mental_health/en/

Yeoh, S. H., Tam, C. L., Wong, C. P., & Bonn, G. (2017). Examining Depressive Symptoms and Their Predictors in Malaysia: Stress, Locus of Control, and Occupation. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.01411

Yigletu, H., Tucker, S., Harris, M., & Hatlevig, J. (2004). Assessing Suicide Ideation:Comparing Self-Report Versus Clinician Report. *Journal of the American Psychiatric Nurses Association*, *10*(1), 9–15. https://doi.org/10.1177/1078390303262655

Zhou, X., Wu, X., & An, Y. (2016). Understanding the Relationship between Trauma Exposure and Depression among Adolescents after Earthquake: The Roles of Fear and Resilience. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.02044

Zimmermann, E. B., Woolf, S. H., & Haley, A. (2015). *Understanding the Relationship Between Education and Health: A Review of the Evidence and an Examination of Community Perspectives | Agency for Healthcare Research & Quality*. https://www.ahrq.gov/professionals/education/curriculum-tools/population-health/zimmerman.html

APPENDICES

Appendix A: List of researchers and list of participating universities

The following provides the names (last, first name) and contact details of researchers involved in the first wave of the SPLASH study.

- **Aliaj, Sulltana**: Associate Professor, University of Tirana, Albania. Contact: aliajtana@hotmail.com
- **Al Shamli, Ali Khalifa**: Coordinator at Physical Education Department, Sohar University, Oman. Contact: AShamli@soharuni.edu.om
- **Begotaraj, Edvaldo**: Research associate at the Department of Dynamic and Clinical Psychology, Sapienza University of Rome, Italy. Contact: edvaldo.begotaraj@uniroma1.it
- **Beqiri, Renisa**: Associate Professor, University of Tirana, Albania. Contact: renisabeqiri@hotmail.com
- **Fischer, Florian**: Associate Professor at the Faculty of Health Sciences, Bielefeld University, Germany. Contact: f.fischer@uni-bielefeld.de
- **Lenning, Beth**: Associate Chair at the Department of Public Health and Director Public Health Undergraduate Program, Baylor University, USA. Contact: Beth_Lanning@baylor.edu
- **Crozier, Alyson:** Program Director: Exercise and Sport Science Portfolio, Division of Health Sciences, School of Health Sciences, University of South Australia, Australia. Contact: alyson.crozier@unisa.edu.au
- **Lin Po-Hsiu**: Associate Professor, National Taiwan Normal University, Taiwan. Contact: rockcatlinjp@yahoo.co.jp
- **Kawachi, Ichiro**: Full Professor at the Department of Social and Behavioral Sciences, Harvard T.H. Chan School of Public Health. Contact: ikawachi@hsph.harvard.edu
- **Khoo, Selina**: Associate professor and deputy director (Postgraduate & Research) at the sports center of the University of Malaya. Contact: selina@um.edu.my
- **La Torre, Giuseppe:** Associate Professor at the Department of Public Health and Infectious Diseases, Sapienza University of Rome, Italy. Contact: giuseppe.latorre@uniroma1.it
- **Ramirez Varela, Andrea**: Associate Professor, Center for Epidemiology Research at the Federal University of Pelotas. Contact: aravamd@gmail.com
- **Siefken, Katja**: Course Coordinator and Lecturer at the School of Health Sciences, University of South Australia. Contact: katja.siefken@unisa.edu.au
- **Soong-nang Jang**: Associate professor, Red Cross College of Nursing, Chung-Ang University, 84 Heukseok-ro Dongjak-gu Seoul, South Korea. Contact: sjang@cau.ac.kr or soongnang@gmail.com
- **Wiehn, Jascha**: Research associate, Faculty of Health Sciences, Bielefeld University, Germany. Contact: jascha.wiehn@uni-bielefeld.de
- **Zaranza, Luciana**: Full Professor, University Center of Brasilia in Brazil. Contact: lucianazaranza@hotmail.com

Names and locations of the institutions

The following provides the names and locations of the institutions which participated in the first wave of the SPLASH study**.** The choice of universities was based on personal affiliations and on the aim of gathering students from diverse backgrounds worldwide. A full list with details is provided below.

Albania

The University of Tirana is a public and the largest university in Albania. An estimated number of over 14.000 students attend this university.

Australia

The University of South Australia is a public research university in the Australian state of South Australia. It is the largest university in South Australia with almost 32.000 students.

Brazil

The University Center of the Federal District (UDF) in Brasilia was created in 1967 and is the first private graduate education institution in the Brazilian capital. There are almost 16.000 students, 300 teachers, and 235 employees, distributed in an undergraduate and postgraduate course.

Germany

The Bielefeld University is located in North Rhine–Westphalia and is one of the country's newer universities and has over 24.000 students.

Italy

The Sapienza University of Rome is a collegiate research university with 11 faculties and is the largest European university by enrolments (n= students 110.000 in 2015/16).

Malaysia

The University of Malaya is a public research university located in Kuala Lumpur, Malaysia. It is the oldest and most esteemed University in Malaysia. Around 17.000 students are enrolled.

Oman

Sohar University was established in 2001 as the first private university in Oman. Around 5.000 students are enrolled.

South Korea

Chung-Ang University is a Korean private university based in Seoul, South Korea with around 21.8000 students.

Switzerland

The University of Zurich in the city of Zurich is located, in the canton of Zurich. With over 26.0000 students, it is the largest university in Switzerland.

Taiwan

The National Taiwan University is a national university in Taipei City. It is considered the most prestigious university in Taiwan and one of the top-ranked universities in the world, and nearly 33.000 students are enrolled.

United States of America:

The Harvard University is a private Ivy League research university in Cambridge, Massachusetts, with about 21.000 students enrolled. Baylor University, or simply Baylor, is a private Christian university in Waco, Texas, with about 16.787 students enrolled.

Appendix B: Institutional Review Board approvals

Albania

REPUBLIKA E SHQIPËRISË
UNIVERSITETI I TIRANËS
FAKULTETI I SHKENCAVE SOCIALE
Bulevardi "Gjergj Fishta" Tirana, Albania. Tel +355 4 230369

Nr. 316 prot

Tirnë, 15.11.2018

ETHICAL COMMITTEE OF THE
DEPARTMENT OF PSYCHOLOGY-PEDAGOGY

TITLE OF THE PROJECT: *Social Capital, Mental Health, Health-Related Quality of Life and Lifestyle habits in university students. An international two-wave Panel Study (SCMH)*

In order to obtain the approval of the Ethical Committee of the Department of Psychology-Pedagogy of the Faculty of Social Sciences of University of Tirana, the project SCMH has been delivered to this Commission and has been examined in data 15/11/2018 with the following evaluation:

☒ The project conforms with the Ethical Code of the Department

☐ The project doesn't conform with the Ethical Code of the Department for the following reasons:

Ethics Approval of SCMH project
(Approval Number 2018/11/15)

Head of the Commission

Prof. Asoc. Zenel Orhani

Australia

Dear Applicant

Re: Ethics protocol "SPLASH - Social Capital and Students' health - An international two-wave Panel Study" (Application ID: 201977)

Thank you for submitting your ethics protocol for consideration. Your protocol has been considered by the E2 Committee Review Group.

I am pleased to advise that your protocol has been granted ethics approval and meets the requirements of the National Statement on Ethical Conduct in Human Research.

Please note that the E2 Committee Review Group's decision will be reported to the next meeting of the Human Research Ethics Committee for endorsement.

Please regard this email as formal notification of approval.

Ethics approval is always made on the basis of a number of conditions detailed at http://www.unisa.edu.au/res/forms/docs/humanresearchethics_conditions.doc; it is important that you are familiar with, and abide by, these conditions. It is also essential that you conduct all research according to UniSA guidelines, which can be found at http://www.unisa.edu.au/res/ethics/default.asp

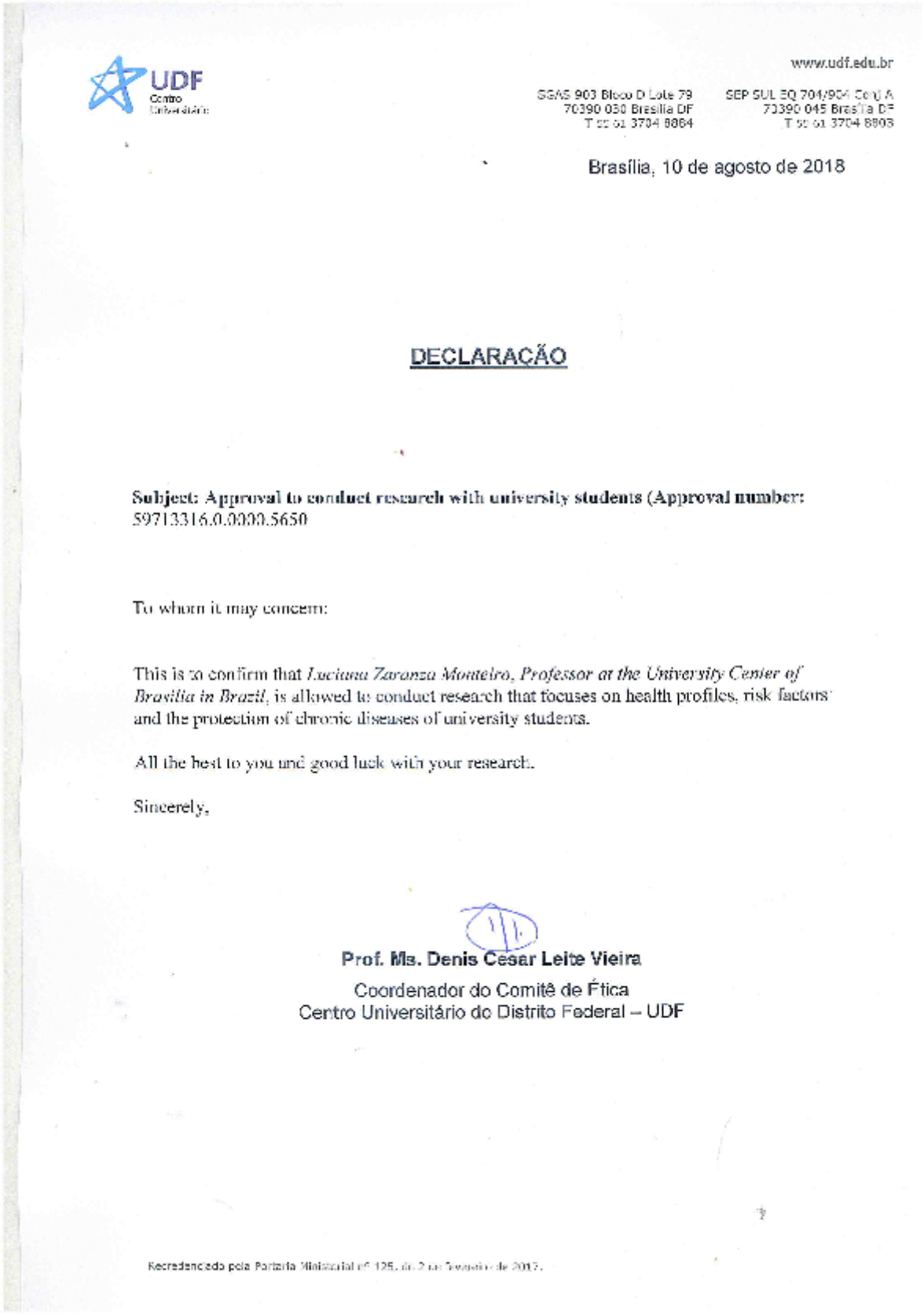
Please note, if your project is a clinical trial you are required to register it in a publicly accessible trials registry prior to enrolment of the first participant (e.g. Australian New Zealand Clinical Trials Registry http://www.anzctr.org.au/) as a condition of ethics approval.

Best wishes for your research.

Executive Officer
UniSA's Human Research Ethics Committee
CRICOS provider number 00121B

This is an automated email and cannot be replied to. Please direct your query to humanethics@unisa.edu.au.

Brazil



UDF Centro Universitário

www.udf.edu.br

SGAS 903 Bloco D Lote 79
70390 030 Brasília DF
T 55 61 3704 8864

SEP SUL EQ 704/904 Conj A
70390 045 Brasília DF
T 55 61 3704 8803

Brasília, 10 de agosto de 2018

DECLARAÇÃO

Subject: Approval to conduct research with university students (Approval number: 59713316.0.0000.5650

To whom it may concern:

This is to confirm that *Luciana Zaranza Monteiro, Professor at the University Center of Brasília in Brazil*, is allowed to conduct research that focuses on health profiles, risk factors and the protection of chronic diseases of university students.

All the best to you and good luck with your research.

Sincerely,

Prof. Ms. Denis Cesar Leite Vieira
Coordenador do Comitê de Ética
Centro Universitário do Distrito Federal – UDF

Recredenciado pela Portaria Ministerial nº 125, de 2 de fevereiro de 2017.

Germany

Universität Bielefeld **Ethik-Kommission**

Ethik-Kommission der Universität Bielefeld
Postfach 10 01 31 | D-33501 Bielefeld

Ethics Committee
The Chairman

Geschäftsstelle:
Fatma Akkaya-Willis
Raum: T5-239
Tel.: 0521 106-4436
ethikkommission@uni-bielefeld.de
Az. 1268

Bielefeld, 06 April 2018

Statement of the Ethics Committee of Bielefeld University on application No.2018 – 065 of 1th March 2018

Short Title of the research: **"Soziales Kapital und Gesundheit – eine Multicenter Kohortenstudie"**

Researcher/Main contact person: Florian Fischer

The Ethics Committee of Bielefeld University has reviewed the application according to the ethical guidelines of the German Association of Psychology (Deutsche Gesellschaft für Psychologie: DGPs), which correspond to the guidelines of the American Psychological Association (APA).

Based on the submitted materials, the Ethics Committee of Bielefeld University approves of the study, as described, as ethically appropriate.

On behalf of the Ethics Committee

Prof. Dr. Gerd Bohner
Chairman

Italy

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERO-UNIVERSITARIA
POLICLINICO UMBERTO I

SAPIENZA
UNIVERSITÀ DI ROMA

Direzione Generale
Unità Ricerca Clinica & Clinical Competence
(URCCC)
Responsabile *Dott. Roberto Pascia*

Rome, 14th September 2018

Object: Ethics Approval (Protocol number: 305/18; Approval number: Rif.Ce: 4991)

To whom it may concern:

This is to confirm that the following project has been approved by the Ethics Committee of Sapienza University:

Social Capital, Mental Health, Health-Related Quality of Life and Lifestyle habits in university students: An international two-wave Panel Study

All the best to you and good luck with your research.

Kind regards,

Prof Giovanni Spera
Presidente Comitato Etico dell'Università 'Sapienza'

Azienda Ospedaliero-Universitaria Policlinico Umberto I
Viale del Policlinico 155, 00161 Roma
Centralino (+39) 06 499/1
Unità di Ricerca Clinica e Clinical Competence (+39) 06 49979622
C.F. e P.IVA 05885511009

Malaysia

UNIVERSITY OF MALAYA

UM.TNC 2/UMREC

28 September 2018

Assoc. Prof. Dr. Selina Khoo Phaik Lin
Centre for Sport and Exercise Sciences
University of Malaya

Dear Sir/Madam,

RESEARCH ETHICS CLEARANCE APPLICATION

On behalf of the University of Malaya Research Ethics Committee (UMREC), we are pleased to inform you that your application as detailed below has been **approved**:

Name of PI :	**Assoc. Prof. Dr. Selina Khoo Phaik Lin**
Title of Proposal:	**Social Capital, Mental Health, Health Related Quality of Life and Lifestyle Behaviors In university students : A two wave panel**
Reference Number:	**UM.TNC2/UMREC - 331**

Kindly proceed with the research in accordance with the University of Malaya Research Ethics Guidelines.

Please do take note that this approval is valid from: **September 2018** till **September, 2021**.

In the case of amendment to the research project, please complete the "Amendment Form" (available from the website) and submit to UMREC office for approval.

For more information about University of Malaya Research Ethics, please visit: http://umresearch.um.edu.my/

Thank you.

Yours sincerely,

PROF. DATIN DR. INDRA VYTHILINGAM
University of Malaya Research Ethics Committee
(UMREC Non-Medical)

s.k Deputy Dean (Research), Centre for Sport and Exercise Sciences
University of Malaya

Oman

جامعة صحار
SOHAR UNIVERSITY

Date: 26 July 2018

1.Dr. Ali Khalifa Al Shamli
Dean Faculty of Education and Arts
Sohar University

2.Mrs. Insa Bakhaus
Department of public health and infection diseases
Sapienza university of Rome

Subject: ETHICAL APPROVAL

This is to inform you that your Ethical Form Application has been addressed and approved by the University Ethics and Biosafety Committee (UEBC) as far as our university is concerned. You can now go ahead and proceed with your research in our university. See below table.

Project Type	Project Title	Status
Research Study	**Social Capital, Mental Health, Health-Related Quality of Life and Lifestyle habits in university students**	Approved

All the best to you and good luck in your research.

Yours Sincerely,

Prof. Ghassan Al-Kindi
Pro. VC Research and Innovation
Chair, University Ethics and Biosafety Committee
Sohar University
Sultanate of Oman

www.soharuni.edu.om
Towards a Knowledge Nation • • • نحو بناء أمة معرفة
P.O.Box:44 | P.C 311 | Sohar | Sultanate of Oman | +968 26720102 | +968 26850100

South Korea

결과통지서

2018년 10월 16일에 접수된 심의 요청사에 대하여 중앙대학교 생명윤리위원회에서 신의하여 다음과 같이 결정하였음을 통지합니다.

관리번호	1041078-201809-HRSB-181-01					
연구과제명	사회적 자본과 대학생 건강 연구					
연구책임자	장숙랑					
신청사	심원	이자경	수석	박사	직위	간호학

심의대상	■ 연구계획서(신규) □ 연구계획서(수정/보완)		
심의일시	2018년 11월 07일	심의장소	중앙대학교 생명윤리위원회
심의위원회	중앙대학교 생명윤리위원회		
심의종류	■ 신규심의 □ 지속심의 □ 연구계획변경 □ 연구계획변경 □ 종료으고 □ 심의면제		
심의결과	■ 승인 □ 수정후승인 □ 수정후신속심의 □ 보완 □ 반리		
승인일자	2018. 11. 28	승인 유효기간	
승인번호	1041078-20 809-HRSB-181-01		
심의의견	상기 과제의 위험 수준은 최소위험(LV.1)으로 승인함. 승인 유효기간: 승인 일로부터 1년.		
심의된 서류	연구계획 심의 의뢰서 1부 연구계획서 1부 연구계획요약서 1부		

귀 중지서의 기재된 사항은 중앙대학교 생명윤리위원회에 기록된 내용과 일치함을 증명합니다.
본 위원회는 생명윤리및안전에 관한법률과 관련 법규를 준수합니다.
귀 연구자 이해상충(Conflict of Interest)이 없는 것으로 판단 검부 연구의 심의에서 배제하였습니다.
본 통지서의 서명은 중앙대학교 생명윤리위원회에서 인정합니다.

https://rsch.cau.ac.kr/ethi/eau_02.html?jq_key=20180900010 2018-11-29

Switzerland

Universität Zürich[UZH]

Philosophische Fakultät
Ethikkommission

Binzmühlestrasse 14, Box 22
CH-8050 Zürich
http://www.phil.uzh.ch/forschung/ethik.html#20

UZH, Philosophische Fakultät, Ethikkommission,
Binzmühlestrasse 14, Box 22, CH-8050 Zürich

Prof. Dr. Andreas Maercker
Department of Psychology
University of Zurich
Binzmühlestrasse 14
8050 Zürich,
Switzerland

Prof. Dr. Klaus Oberauer
Präsident der Ethikkommission
k.oberauer@psychologie.uzh.ch

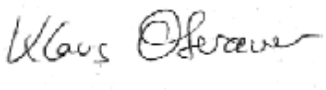
Zürich, 20.07.2018

Ethics Approval (Approval Number 2018.4.8)

This is to confirm that the following project has been approved by the Ethics Committee of the Faculty of Arts and Social Sciences at Zurich University:

> *Social Capital, Mental Health, Health-Related Quality of Life and Lifestyle habits in university students: An international two-wave Panel Study*

Kind regards



Klaus Oberauer
President of the Ethics Committee

Seite 1/1

Taiwan

臺北市大安區和平東路一段162號
162, Section 1, Heping E. Rd.,
Taipei City 106, Taiwan.
Tel：886-2-77341395

國立臺灣師範大學
National Taiwan Normal University

研究倫理審查核可證明書

計畫名稱：大學生社會資本、生活品質、生活習慣與健康二波段追蹤研究
案件編號：201806HS009
校/系/計畫主持人：國立臺灣師範大學/運動休閒與餐旅管理研究所/林伯修副教授
計畫書版本/日期：2018/05/25/Version01
知情同意文件版本/日期：2018/10/18/Version4
案件類型：微小風險審查案件
審查聲明：本案符合規範，經研究倫理審查會決議，本會同意核發本案核可證明。
通過日期：西元 2018 年 10 月 22 日
有效期間：西元 2018 年 11 月 1 日至 2019 年 6 月 30 日止
※計畫內容若有任何修改，或增加招募人數，應申請變更審查通過後，始得實施。
※本案應於核可證明屆期前申請持續審查通過，方可繼續執行，並應於核可證明屆期後三個月內，辦結案審查。

國立臺灣師範大學研究倫理審查委員會
主任委員
李思賢
西元 2018 年 10 月 22 日

Certificate of REC Approval

Proposal Title: Social Capital, Mental Health, Health-Related Quality of Life and Lifestyle habits in university students: A two wave Panel Study
REC Number: 201806HS009
University/Dept./Principal Investigator: National Taiwan Normal University/ Graduate Institute of Sport, Leisure and Hospitality Management/ Associate Professor Po-Hsiu Lin
Project Version/Date: 2018/05/25/Version01
Informed Consent Document Version/Date: 2018/10/18/Version4
Type/REC Announcement: Exempt Expedited Review
NTNUREC retains the right to revoke the approval before the final endorsement by board.
Approval Date: October 22, 2018
Effective Period: November 1, 2018 to June 30, 2019
※Amendments should be submitted to REC before implementation if there are any changes to the approved protocol, including increasing participant enrollment.
※Continuing Review Applications should be submitted to REC before the current approval expires. The final report should be submitted within 3 months after expiration.

Tony Szu-Hsien Lee
Chairperson
Research Ethics Committee, National Taiwan Normal University
October 22, 2018

USA

HARVARD
Human Research Protection Program

Harvard T.H. Chan School of Public Health
Office of Human Research Administration
90 Smith Street, 3rd Floor
Boston, MA 02120
Federalwide Assurance FWA00002642

Notification of Initial Study Approval

August 7, 2018

Ichiro Kawachi
ikawachi@hsph.harvard.edu

Protocol Title:	SPLASH - Social Capital and Students' health - An international two-wave Panel Study
Principal Investigator:	Ichiro Kawachi
Protocol #:	IRB18-1203
Funding Source:	None
Review Date:	8/7/2018
STUDY Effective Date:	8/7/2018
IRB Review Type:	Expedited
IRB Review Action:	Approved

The Institutional Review Board (IRB) of the Harvard T.H. Chan School of Public Health approved this Initial Study.

This approval includes the following:
- Initial Application, IRB18-1203
- Consent Form: HRP-502-CONSENT-HLMA-Adult-Consent-Form.pdf (0.01)
- IRB Protocol: HRP-503-HLMA-Research-Protocol 8 7 18.docx (0.01)
- Study Instrument/Tools: Revised Survey Template (1.1)
- Study Instrument/Tools: Reminder Template (0.01)

Additionally, the IRB has reviewed the following documents:
- Other: Referral Letter (0.01)
- Research Location Information: Ethical Approval_Oman.pdf (0.01)
- Research Location Information: Ethical Approval Switzerland (0.01)

The IRB is in receipt of the following documents:
- Foreign Language Documents:
  Ethical Approval Brazil (0.01)
  Ethical Approval Italy (0.01)
  Ethical Approval Germany (0.01)

The IRB made the following determinations:

BAYLOR
UNIVERSITY

Institutional Review Board (IRB) Authorization Agreement

Name of Institution or Organization Providing IRB Review (Institution A):
Harvard T.H. Chan School of Public Health

IRB Registration #: IRB00000271

Federalwide Assurance (FWA) #: FWA00002642

Name of Institution Relying on the Designated IRB (Institution B):
Baylor University

FWA #: FWA00008275

The Officials signing below agree that Baylor University may rely on the designated IRB for review and continuing oversight of its human subjects research described below: (*check one*)

(X) This agreement is limited to the following specific protocol(s):

Name of Research Project: Splash – Social Capital and Students' Health
Name of Principal Investigator: Ichiro Kawachi
Sponsor or Funding Agency: _____
Award Number, if any: _____

(___) Other (*describe*):_____

The review performed by the designated IRB will meet the human subject protection requirements of Institution B's OHRP-approved FWA. The IRB at Institution A will follow written procedures for reporting its findings and actions to appropriate officials at Institution B. Relevant minutes of IRB meetings to Institution B upon request. Institution B remains responsible for ensuring compliance with the IRB's determinations and with the Terms of its OHRP-approved FWA. This document must be kept on file by both parties and provided to OHRP upon request.

Signature of Signatory Official (Institution A): _____ Date: 9/7/18

Delia Y. Wolf, MD, JD, MSCI
Associate Dean, Regulatory Affairs & Research Compliance
Harvard T.H. Chan School of Public Health Institutional Official

Signature of Signatory Official (Institution B): _____ Date: 9/10/18

Gary C. Mortenson
Acting Vice Provost of Administration

ATTEST: _____
Marsha J. Duckworth
Assistant Secretary

IRB Authorization Agreement 2014 04 25

Appendix C: Questionnaire

The following provides the English questionnaire template.

Key Information

The following is a short summary of this study to help you decide whether or not to participate. More detailed information is listed later on in this form.

Why am I being invited to take part in a research study?

We have invited you to take part in a research study because you are aged between 18 – 30 years and you are in your first year of your graduate studies and because you are enrolled full-time at one of the participating universities. The purpose of the survey is to explore the well-being and health of university students in several countries across the globe.

What should I know about a research study?

- Someone will explain this research study to you.
- Whether or not you take part is up to you.
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You may discuss your decision with your family, your friends and/or your doctor.
- You can ask all the questions you want before you decide.

If you do decide to participate, your individual responses, including any contact information you provide, are confidential and will not be shared with colleges, or universities. Your name will not appear in any publication of results. Instead, a final report, including summary data only, will be provided so the researchers can compare the views of students from their university/country with those of students from other universities/countries. This report will not include any of your personal information.

Why is this research being done?

Mental health problems and unhealthy lifestyle habits are common in university students, yet often underestimated. Social Capital, including friendships and networks, is believed to play a significant role in well-being, mental health and lifestyle choices. It is believed that individuals with higher levels of Social Capital enjoy better mental health than individuals with lower levels of Social Capital. Until now, little attention has been drawn to the association between Social Capital and health in university students. Therefore, this study aims to explore how Social Capital may influence health.

How long will I take part in this research?
You will be asked to fill out a questionnaire which lasts about 20 minutes. The questionnaire will ask you questions concerning your health and well-being, including the amount of physical activity, perceived stress and smoking and drinking habits.

At the end of the survey, you will be asked if you are interested in participating in an additional survey by email. This will help us to detect changes of health over time. The second survey will be emailed to you at the beginning of second semester and will take 20 minutes to complete.

Is there any way being in this study could be bad for me?
You may feel uncomfortable answering questions about health such as depression. More detailed information about the risks of this study can be found under the *"What are the risks and possible discomforts?"* section.

Will being in this study help me in any way?
There are no direct benefits to you from your participation in this research. We cannot promise any benefits to others from your participation in this research. However, your responses may help us learn more about the health and well-being of university students.

What happens if I do not want to be in this research?
Your participation in this research is voluntary. Your alternative to participating in this research study is to not participate and you may decline participation. If you decide to participate you may stop at any point in the survey without stating reasons. This will not cause you any disadvantages.

Who can I talk to?
If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at +1 856 472 2135, or via email at ibackhaus@hsph.harvard.edu or at insa.backhaus@uniroma1.it

General Information

1) How old are you?

Age: _____years

2) What is your sex?

☐ Male

☐ Female

☐ Other, namely: _____

3) Are you Hispanic, Latino/a, or Spanish origin? What is your ethnicity?

☐ Hispanic or Latino

☐ Yes, Mexican, Mexican Am., Chicano
☐ Yes, Puerto Rican
☐ Yes, Cuban

☐ No, not of Hispanic, Latino or Spanish origin

4) Which category best describes your race? You may tick several answers here.

☐ American Indian or Alaska Native

☐ Black or African American

☐ Asian Indian

☐ Chinese

☐ Filipino

☐ Japanese

☐ Vietnamese

☐ Other Asian (Please see Table 1):_____

☐ White

☐ Native Hawaiian

☐ Guamanian or Chamorro

☐ Samoan

☐ Other Pacific Islander (Please see Table 2): _____

Table 1: Other Asian	
Bangladeshi Bhutanese Burmese Cambodian Taiwanese Hmong Indonesian Loation Malaysian	Okinawan Pakistani Sri Lankan Thai Iwo Jiman Maldivian Nepalese Singaporean Madagascar

Table 2: Other Pacific Islander		
Polynesian Tahitian Tongan Tokelauan Guamanian	Micronesian Mariana Islander Saipanese Palauan Carolinian Kosraean Kiribati Pohnpeian Chuukese Yapese Marshallese KribatI Other Micronesian	Melanesian Fijian Papua New Guinean Solomon Islander New Hebrides

5) What is the highest level of education completed by your father (or stepfather or male guardian) and mother (or stepmother or female guardian)?

Father/stepfather/male guardian	Mother/stepmother/female guardian
☐ 1.Middle school/Jr. High	☐ 1.Middle school/Jr. High
☐ 2.High School	☐ 2.High School
☐ 3.Higher education: first level (Undergraduate)	☐ 3.Higher education: first level (Undergraduate)
☐ 4.Higher education: second level and third level (Graduate)	☐ 4.Higher education: second level and third level (Graduate)
☐ 5.Other/unknown	☐ 5.Other/unknown

6) Which best describes the employment of your father (or stepfather or male guardian) and mother (or stepmother or female guardian)?

Father/stepfather/male guardian	Mother/stepmother/female guardian
☐ 1. Working at least full-time for pay	☐ 1. Working at least full-time for pay
☐ 2. Working part-time only for pay	☐ 2. Working part-time only for pay
☐ 3. Not working for pay, but looking for a job	☐ 3. Not working for pay, but looking for a job
☐ 4. Other (e.g. Househusband/homemaker, pensioner)	☐ 4. Other (e.g. Housewife/homemaker, pensioner)

7) Where do you live during term time (Monday until Friday)?

☐ 1. Parents' house
☐ 2. Relative's house
☐ 3. College residence on/off campus
☐ 4. Rented house/flat
☐ 5. Other, please specify: _____

8) To what extent do you agree with the statement, I have sufficient income in order to cover my monthly costs?

Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
☐[1]	☐[2]	☐[3]	☐[4]	☐[5]

Social Capital

This questionnaire is about your social capital and includes questions about social networks, social cohesion, sense of belonging, etc. For each question, please check the box that best describes your experience. There are no right or wrong answers.

1) Do you belong to any clubs, groups, or associations (e.g. sports groups, hobby groups, cultural societies, religious groups, political groups, etc.….)?

☐ 1. No ➲ go to question 4

☐ 2. Yes

2) Now, please name the group, club, organization or network that is most important to you personally.

_____

3) If YES, are the members of your group <u>similar</u> to each other with regard to:

	1. No	2. Yes
Religion	☐	☐
Gender	☐	☐
Age	☐	☐
Race/Ethnicity	☐	☐
Nationality	☐	☐
Sexual Orientation	☐	☐
Educational Attainment (e.g. from the same college)	☐	☐
Faculty	☐	☐
Political Organization	☐	☐
Others, please specify: _____	☐	☐

4) How many close friends do you have? (These are people you feel at ease with, you can talk to about private matters or call on for help).

Please indicate: _____

5) If you suddenly needed to borrow a small amount of money, are there people beyond your immediate household and close relatives to whom you could turn, and who would be willing and able to lend you cash?

Definitely	Probably	Unsure	Probably not	Definitely not
☐1	☐2	☐3	☐4	☐5

6) Would you say that most people can be trusted or that you cannot be too careful in dealing with people?

☐ 1. People can be trusted

☐ 2. You can't be too careful

7) In general, do you agree or disagree with the following statements?

	Agree strongly	Agree somewhat	Neither agree or disagree	Disagree somewhat	Disagree strongly
a. Most people at this university are willing to help if you need it	☐1	☐2	☐3	☐4	☐5
b. At this university one has to be alert or someone is likely to take advantage of you	☐1	☐2	☐3	☐4	☐5

8) If a university project does not directly benefit you but has benefits for many others at the university, would you contribute time or money to the project?

A. Time	B. Money
☐ 1. Will not contribute time	☐ 1. Will not contribute money
☐ 2. Will contribute time	☐ 2. Will contribute money

9) How many times in the past month have you got together with people to have food or drinks, either in their home or in a public place?

Please indicate: _____

10) In the last month, how many times have people visited you in your home?

Please indicate: _____

11) In the last month, how many times have you visited people in their home?

Please indicate: _____

12) In the past 12 months, did you or any one in your household participate in any communal activities, in which people came together to do some work for the benefit of the community?

☐ Yes

☐ No

13) If there was a problem (e.g. bullying, problems with a teacher) at this university, how likely is it that people will cooperate to try to solve the problem?

☐ 1. Very likely

☐ 2. Somewhat likely

☐ 3. Neither likely or unlikely

☐ 4. Somewhat unlikely

☐ 5. Very unlikely

14) Do you feel that you have the power to make important decisions that change the course of your life?

☐ 1. Totally unable to change life

☐ 2. Mostly unable to change life

☐ 3. Neither able nor unable

☐ 4. Mostly able to change life

☐ 5. Totally able to change life

General Health

This questionnaire asks for your views about your health. This information will help keeping track of how you feel and how well you are able to do your usual activities. Please answer every question by marking one box. If you are unsure about how to answer, please give the best answer you can.

1) In general, would you say your health is:

Excellent	Very good	Good	Fair	Poor
☐1	☐2	☐3	☐4	☐5

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

Activities	Yes, limited a lot	Yes, limited a little	No, not limited at all
2) Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf	☐1	☐2	☐3
3) Climbing several flights of stairs	☐1	☐2	☐3

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities because of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
4) Accomplished less than you would like	☐1	☐2	☐3	☐4	☐5
5) Were limited in the kind of work or other activities	☐1	☐2	☐3	☐4	☐5

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities because of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
6) Accomplished less than you would like	☐1	☐2	☐3	☐4	☐5
7) Did work or other activities less carefully than usual	☐1	☐2	☐3	☐4	☐5

8) During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
☐1	☐2	☐3	☐4	☐5

These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks?

	All of the time	Most of the time	Some bit of the time	A little bit of the time	None of the time
9) Have you felt calm and peaceful	☐1	☐2	☐3	☐4	☐5
10) Did you have a lot of energy	☐1	☐2	☐3	☐4	☐5
11) Have you felt downhearted and blue	☐1	☐2	☐3	☐4	☐5

12) During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some bit of the time	A little bit of the time	None of the time
☐1	☐2	☐3	☐4	☐5

Perceived Stress

The next ten questions ask you about your feelings and thoughts during the **last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

In the last month, how often have you…	**Never**	**Almost never**	**Sometimes**	**Fairly often**	**Very often**
1) … been upset because of something that happened unexpectedly?	0	1	2	3	4
2) …felt that you were unable to control the important things in your life?	0	1	2	3	4
3) …felt nervous and "stressed"?	0	1	2	3	4
4) …felt confident about your ability to handle your personal problems?	0	1	2	3	4
5) … felt that things were going your way?	0	1	2	3	4
6) …found that you could not cope with all the things that you had to do?	0	1	2	3	4
7) … been able to control irritations in your life?	0	1	2	3	4
8) … felt that you were on top of things?	0	1	2	3	4
9) … been angered because of things that were outside of your control?	0	1	2	3	4
10) … felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Depressive Symptoms

This part is about your present feelings. For each question, please indicate how often you have the mentioned feeling or share the described perspective. If you never have the feeling described in the statement, please circle 0. If you have the feeling almost always, please circle 5. If you have the feeling rarely, circle 1. If you have the feeling often, circle 4. If you have the feeling somewhat more than rarely, circle 2. If you have the feeling somewhat less than often, circle 3.

	Never always					Almost
1) I feel sad.	0	1	2	3	4	5
2) I feel discouraged about the future.	0	1	2	3	4	5
3) I feel like a failure.	0	1	2	3	4	5
4) I have a hard time enjoying things.	0	1	2	3	4	5
5) I feel guilty.	0	1	2	3	4	5
6) I feel punished.	0	1	2	3	4	5
7) I am disappointed in myself.	0	1	2	3	4	5
8) I blame myself for my faults and weaknesses.	0	1	2	3	4	5
9) I think about killing myself.	0	1	2	3	4	5
10) I cry.	0	1	2	3	4	5
11) I feel annoyed and irritated.	0	1	2	3	4	5
12) I have no interest in people.	0	1	2	3	4	5
13) I put off making decisions.	0	1	2	3	4	5
14) I worry about my looks.	0	1	2	3	4	5
15) I have to push myself to do things.	0	1	2	3	4	5
16) I do not sleep well.	0	1	2	3	4	5
17) I feel tired.	0	1	2	3	4	5
18) I have no appetite.	0	1	2	3	4	5
19) I am worried about my health.	0	1	2	3	4	5
20) I have no interest in sex.	0	1	2	3	4	5

Smoking

1) Do you smoke?

☐ Yes, daily

☐ Yes, occasionally ➲ skip to questions 3

☐ No ➲ skip to question 4

2) How many cigarettes do you usually smoke on average each day?

☐ Does not smoke cigarettes

☐ Fewer than 20

☐ 20 or more

3) Compared with two years ago would you say you now have reduced smoking?

☐ Yes ➲ go to the next section („alcohol consumption “)
☐ No ➲ go to the next section („alcohol consumption“)

4) Have you ever smoked?

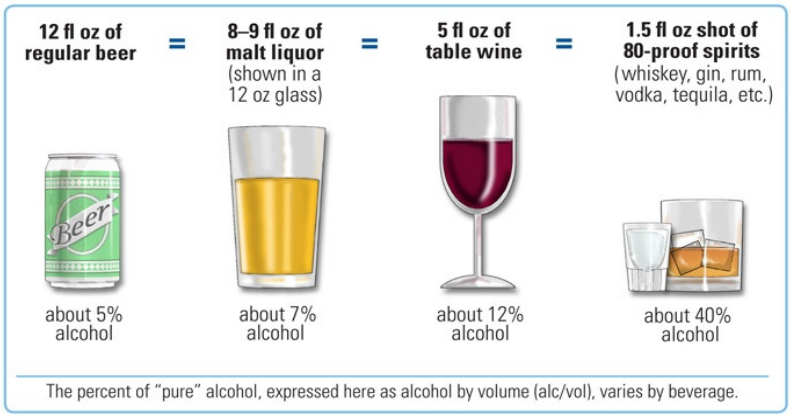
☐ Yes, daily
☐ Yes, occasionally
☐ No ➲ go to the next section („alcohol consumption“)

5) How long ago did you stop smoking?

☐ Less than 2 years ago

☐ 2 years ago, or more

Alcohol Consumption



a) How often do you drink alcohol?

- ☐ Never ➲ if never go to section „Physical Activity“
- ☐ Monthly or less
- ☐ 2-4 times a month
- ☐ 2-3 times a week
- ☐ 4 or more times a week

b) How many standard drinks containing alcohol do you have on a typical day when drinking?

- ☐ 1 or 2
- ☐ 3 or 4
- ☐ 5 or 6
- ☐ 7 to 9
- ☐ 10 or more

c) How often do you have six or more drinks on one occasion?

- ☐ Never
- ☐ Less than monthly
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

Physical Activity

The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. **During *the last 7 days*, on how many days did you do *vigorous physical activities* like heavy lifting, digging, aerobics, or fast bicycling?**

   _____ **day(s) per week**
   ☐ No vigorous physical activities ➲ skip to question 3

2. **How much time did you usually spend doing *vigorous physical activities* on one of those days?**

   _____**hours per day**
   _____**minutes per day**

   ☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. **During the *last 7 days*, on how many days did you do *moderate physical activities* like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.**

   _____ **day(s) per week**

   ☐ No moderate physical activities ➲ skip to question 5

4. **How much time did you usually spend doing *moderate* physical activities on one of those days?**

_____**hours per day**

_____**minutes per day**

☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

_____**day(s) per week**

☐ Not walking ➲ Skip to question 7

6. How much time did you usually spend *walking* on one of those days?

_____**hours per day**

_____**minutes per day**

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the *last 7 days*, how much time did you spend *sitting* on a weekday?

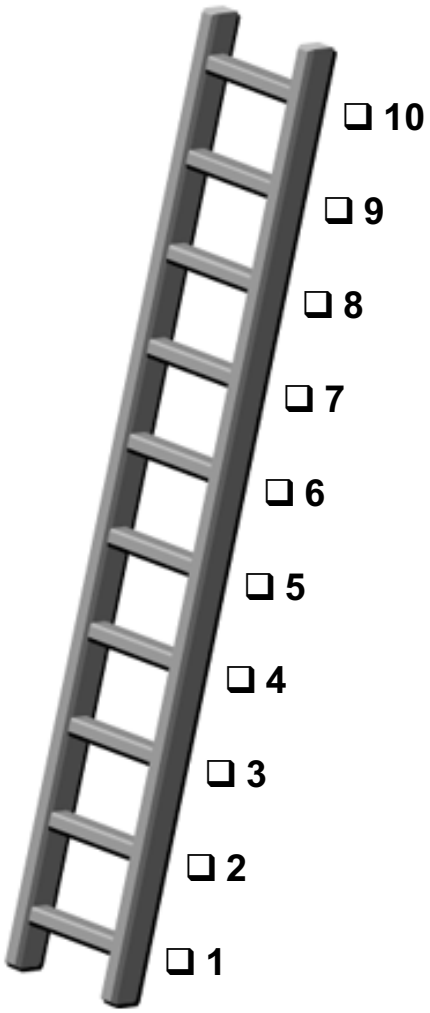
_____**hours per day**

_____**minutes per day**

☐ Don't know/Not sure

Social Status

Think of a ladder with 10 steps representing where people stand in the United States. At step 10, are people who are the best off – those who have the most money, the most education, and the most respected jobs. At step 1 are the people who are worst off – those who have the least money, least education, and the least respected jobs or no job. Where would you place yourself on this ladder?



Personal Code

In order to preserve your anonymity, we would like to ask you to answer the following questions and to generate a personal code. This allows us to match your current survey with your follow-up online survey but keeping your privacy and anonymity. Please read each sentence below carefully and circle the correct letter/number for each question.

1. **What is the FIRST LETTER OF YOUR MOTHER'S or female caregiver's first name?** (Please write "N/A" if this does not apply to you). Please use the first letter of her full name and not nickname (e.g.: If your mother or female caregiver's first name is "Elizabeth," please circle "E" for Elizabeth and not "L" for Liz).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

2. **What is the *FIRST LETTER OF YOUR FATHER'S* or male caregiver's first name?** (Please write "N/A" if this does not apply to you). Please use the first letter of his full name and not nickname. (e.g. If your father or male caregivers' first name is "Robert," please circle "R" for Robert and not "B" for Bob).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

3. **What is the *FIRST LETTER* of the city where you were born?**

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

4. **What is the LAST letter of your eye color?**

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

5. **What is the day of your birthday?** (E.g. If your birthday is January 7 please circle 7, if it is May 12 please circle 12, etc. …)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

6. **How many *BIOLOGICAL OLDER BROTHERS* do you have?**

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

7. **How many *BIOLOGICAL OLDER SISTERS* do you have?**

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Follow-Up

In the beginning of the second semester, we plan to do a follow-up survey. The purpose of this follow up study is to understand how students' health changed over time. If you would like to continue to support this research, you are welcome to take part in the follow-up survey. In order to make the survey situation as easy as possible for you, we would like to send you an online link via e-mail. For this, we kindly like to ask you to provide your e-mail address below. To guarantee your anonymity, your e-mail address will be stored separately from other data. In case you change your mind later about participating in the follow-up survey, you can always decline the request when contacted.

☐ Yes, I agree that I can be contacted via e-mail in case of a follow-up survey.

E-mail address: _____

After providing your e-mail address, we would like to ask you to separate this page from the rest of the questionnaire and return it separately to the research group. If you do decide to participate, your contact information is confidential and will not be shared with colleges, universities or any other third parties.

Thank you for your time and participation in this survey.
Your answers are a valuable part of this research.

Appendix D: Missing data for each country

Table 1A. Missing data for sociodemographic characteristics by country

	ALB (n = 258)	**AUS (n = 397)**	**BRA (n = 549)**	**GER (n = 708)**	**ITA (n = 402)**	**KOS (n = 142)**
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**
Gender	0 (0)	1 (0.3)	0 (0)	5 (0.7)	0 (0)	0 (0)
SES	0 (0)	0 (0)	0 (0)	4 (0.6)	2 (0.5)	0 (0)
Perceived level of income[a]	0 (0)	1 (0.3)	0 (0)	7 (1.0)	9 (2.2)	0 (0)
Living during term time	0 (0)	0 (0)	0 (0)	6 (0.8)	12 (3.0)	0 (0)

Note: ALB = Albania, AUS = Australia, BRA = Brasil, GER = Germany, ITA = Italy, KOS = Kosovo of America; [a]I have sufficient income to cover my monthly costs

Table 1B. Missing data for sociodemographic characteristics by country

	MYS (n = 444)	**OMN (n = 278)**	**KOR (n = 319)**	**CHE (n = 251)**	**TWN (n = 214)**	**USA (n = 266)**
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Gender	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0.4)
SES	0 (0)	1 (0.4)	0 (0)	0 (0)	2 (0.9)	0 (0)
Perceived level of income[a]	1 (0.2)	0 (0)	0 (0)	0 (0)	214 (100.0)	0 (0)
Living during term time	0 (0)	29 (10.4)	0 (0)	0 (0)	214 (100.0)	0 (0)

Note: MYS = Malaysia, OMN = Oman, KOR = South Korea, CHE = Switzerland, TWN = Taiwan, USA = Unites States of America; [a]I have sufficient income to cover my monthly costs

Appendix E: Additional Analyses

Table 2A. Additional Analysis using Corruption Perception Index depressive symptoms

	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)
Social capital behavioral dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**1.51 (1.29 - 1.76)**	**1.45 (1.21 - 1.74)**	**1.43 (1.20 - 1.72)**
Social capital cognitive dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**1.82 (1.44 - 2.29)**	**1.67 (1.27 - 2.22)**	**1.67 (1.26 - 2.21)**
Gender			
Male (ref)	1.00	1.00	1.00
Female	**1.36 (1.16 - 1.60)**	1.09 (0.90 - 1.32)	1.13 (0.95 - 1.36)
Age	1.00 (1.00 - 1.00)	1.00 (1.00 - 1.00)	1.00 (1.00 - 1.02)
Socioeconomic status			
High (ref)	1.00	1.00	1.00
Low	1.45 (1.24 - 1.70)	1.32 (1.11 - 1.58)	1.32 (1.11 - 1.58)
Self-rated health			
Good (ref)		1.00	1.00
Fair/poor		**2.50 (1.94 - 3.22)**	**2.49 (1.93 - 3.21)**
Perceived stress			
Low stress (ref)		1.00	
High stress		**17.57 (11.33 - 27.26)**	
Smoking status			
Non-smoker (ref)		1.00	1.00
Ever smoker		1.06 (0.81 - 1.38)	1.08 (0.83 - 1.41)
Alcohol consumption			
Non-hazardous (ref)		1.00	1.00
Hazardous		0.99 (0.75 - 1.13)	1.04 (0.83 - 1.29)
Physical activity			
Low (ref)		1.00	1.00
Moderate		0.92 (0.75 - 1.13)	0.91 (0.74 - 1.11)
Vigorous		**0.62 (0.49 - 0.78)**	**0.63 (0.50 - 0.80)**
Country-level characteristics/contextual factors			
Level of corruption			
Less corrupt countries (ref)			1.00
More corrupt countries			**3.22 (1.21 - 8.58)**
ICC	0.19 (0.09 - 0.36)	0.22 (0.11 - 0.41)	0.15 (0.07 - 0.31)

Table 2B. Detailed sex-stratified analysis

	Female			Male		
	Model 1 OR (95% CI)	**Model 2 OR (95% CI)**	**Model 3 OR (95% CI)**	**Model 1 OR (95% CI)**	**Model 2 OR (95% CI)**	**Model 3 OR (95% CI)**
Social capital behavioral dimension						
High social capital (ref)	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Low social capital	1.42 (1.14 - 1.65)	1.41 (1.18 - 1.78)	1.47 (1.18 - 1.83)	1.61 (1.21 - 2.16)	1.45 (1.04 - 2.02)	1.44 (1.03 - 2.00)
Social capital cognitive dimension						
High social capital (ref)	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Low social capital	1.66 (1.24 - 2.22)	1.56 (1.09 - 2.21)	1.54 (1.08 - 2.19)	2.15 (1.45 - 3.18)	1.94 (1.21 - 3.09)	1.91 (1.20 - 3.05)
Age	1.00 (0.97 - 1.02)	1.00 (0.97 - 1.03)	1.00 (0.97 - 1.03)	1.02 (0.97 - 1.03)	1.03 (0.96 - 1.11)	1.03 (0.96 - 1.10)
Socioeconomic status						
High (ref)	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Low	1.37 (1.14 - 1.64)	1.24 (1.00 - 1.53)	1.24 (1.00 - 1.53)	1.66 (1.25 - 2.19)	1.45 (1.04 - 2.00)	1.47 (1.06 - 2.03)
Self-rated health						
Good (ref)		*1.00*	*1.00*		*1.00*	*1.00*
Poor/fair		2.66 (1.92 - 3.69)	2.65 (1.91 - 3.67)		1.99 (1.29 - 3.07)	1.95 (1.27 - 3.01)
Perceived stress						
Low stress (ref)		*1.00*	*1.00*		*1.00*	*1.00*
High stress		14.83 (9.19 - 13.94)	14.93 (9.25 - 14.11)		50.64 (11.98 - 14.06)	51.40 (12.61 - 16.68)
Smoking status						
Non-smoker (ref)		*1.00*	*1.00*		*1.00*	*1.00*
Ever smoker		1.51 (1.06 -2.15)	1.51 (1.06 - 2.15)		0.55 (0.37 - 0.84)	0.55 (0.36 - 0.83)
Alcohol consumption						
Non-hazardous (ref)		*1.00*	*1.00*		*1.00*	*1.00*
Hazardous		1.03 (0.77 - 1.40)	1.04 (0.77 - 1.40)		0.97 (0.67 - 1.39)	0.97 (0.67 - 1.39)
Physical activity						
Low (ref)		*1.00*	*1.00*		*1.00*	*1.00*
Moderate		0.90 (0.70 - 1.15)	0.90 (0.70 - 1.16)		1.00 (0.67 - 1.50)	1.01 (0.68 - 1.51)
High		0.55 (0.41 - 0.74)	0.55 (0.41 - 0.75)		0.69 (0.45 - 1.06)	0.70 (0.46 - 1.08)
Country-level characteristics						
Level of economic development						
High-income (ref)			*1.00*			*1.00*
Lower to upper-			3.16 (1.03 - 9.63)			3.29 (1.10 - 9.84)

middle-income						
ICC	0.19 (0.09 - 0.41)	0.24 (0.11 - 0.43)	0.17 (0.08 - 0.33)	0.20 (0.09 - 0.38)	0.22 (0.10 - 0.43)	0.15 (0.06 - 0.34)

Table 2C. Additional analysis using corruption perception index suicide ideation

	Model 1	Model 2	Model 3
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Social capital behavioral dimension			
High social capital (ref)	*1.00*	*1.00*	*1.00*
Low social capital	**1.33 (1.12 - 1.58)**	**1.24 (1.03 - 1.51)**	**1.24 (1.03 - 1.51)**
Social capital cognitive dimension			
High social capital (ref)	1.00	1.00	1.00
Low social capital	**1.93 (1.52 - 2.46)**	**1.84 (1.39 - 2.43)**	**1.83 (1.39 - 2.42)**
Gender			
Male (ref)	*1.00*	*1.00*	*1.00*
Female	0.92 (0.78 - 1.09)	0.84 (0.70 - 1.02)	0.84 (0.69 - 1.02)
Age	1.00 (0.98 - 1.03)	1.01 (0.98 - 1.03)	1.00 (0.95 - 1.04)
Socioeconomic status			
High (ref)	*1.00*	*1.00*	*1.00*
Low	**1.26 (1.06 - 1.49)**	1.17 (0.97 - 1.40)	1.16 (0.97 - 1.40)
Self-rated health			
Good (ref)		*1.00*	*1.00*
Fair/poor		**1.76 (1.39 - 2.22)**	**1.76 (1.39 - 2.22)**
Perceived stress			
Low stress (ref)		*1.00*	*1.00*
High stress		**3.59 (2.70 - 4.77)**	**3.59 (3.70 - 4.22)**
Smoking status			
Non-smoker (ref)		*1.00*	*1.00*
Ever smoker		**1.41 (1.06 - 1.89)**	**1.42 (1.07 - 1.90)**
Alcohol consumption			
Non-hazardous (ref)		*1.00*	*1.00*
Hazardous		**1.41 (1.14 - 1.78)**	**1.44 (1.15 - 1.80)**
Physical activity			
Low (ref)		*1.00*	*1.00*
Moderate		0.84 (0.68 - 1.05)	0.84 (0.68 - 1.05)
High		**0.64 (0.50 - 0.82)**	**0.64 (0.50 - 0.82)**
Country-level characteristics			
Level of corruption			
Less corrupt (ref)			*1.00*
More corrupt			2.42 (0.69 - 8.49)
ICC	0.23 (0.12 - 0.41)	0.26 (0.13 - 0.45)	0.23 (0.11 - 0.42)

Appendix F: Other works and publications during my PhD

First author publications:

Backhaus, I., Kino, S., Torre, G. L., & Kawachi, I. (2019). Right-wing populism and self-rated health in Europe: A multilevel analysis. J Epidemiol Community Health, jech-2018-211995. https://doi.org/10.1136/jech-2018-211995

Backhaus, I., D'Egidio, V., Saulle, R., Masala, D., Firenze, A., De Vito, E., … La Torre, G. (2019). Health-related quality of life and its associated factors: Results of a multi-center cross-sectional study among university students. Journal of Public Health (Oxford, England). https://doi.org/10.1093/pubmed/fdz011

Backhaus, I., Mannocci, A., & La Torre, G. (2019). Systematic review of economic evaluation studies of drug-based non-malignant chronic pain treatment. Current Pharmaceutical Biotechnology. https://doi.org/10.2174/1389201020666190717095444

Backhaus, I., D'Egidio, V., Grassucci, D., Gelardini, M., Ardizzone, C., & La Torre, G. (2017). Link between perceived smoking behaviour at school and students smoking status: A large survey among Italian adolescents. *Public Health*, *151*, 169–176. https://doi.org/10.1016/j.puhe.2017.07.004

Backhaus, I., Mannocci, A., & La Torre, G. (2017). Tobacco smoking and multiple sclerosis: A systematic review of systematic and narrative reviews of observational studies. *Journal of Public Health*, *25*(5), 453–460. https://doi.org/10.1007/s10389-017-0811-6

Book chapter:

Backhaus, I., Mannocci, A., Torre, G. L., & Liccardi, A. (2019). Chapter 13 - Cigarette Smoking and Nicotine: Effects on Multiple Sclerosis. In V. R. Preedy (Ed.), *Neuroscience of Nicotine* (pp. 97–105). https://doi.org/10.1016/B978-0-12-813035-3.00013-7

Main co-author publications:

Mannocci, A**., Backhaus, I.,** D'Egidio, V., Federici, A., Villari, P., & La Torre, G. (2019). What public health strategies work to reduce the tobacco demand among young people? An umbrella review of systematic reviews and meta-analyses. *Health Policy*. https://doi.org/10.1016/j.healthpol.2019.02.009

Cocchiara, R. A., Sciarra, I., D'Egidio, V., Sestili, C., Mancino, M., **Backhaus, I**., … La Torre, G. (2018). Returning to work after breast cancer: A systematic review of reviews. *Work (Reading, Mass.)*, *61*(3), 463–476. https://doi.org/10.3233/WOR-182810

La Torre, G., Sinopoli, A., Sestili, C., D'Egidio, V., Di Bella, O., Cocchiara, R. A., **Backhaus, I.**… Mannocci, A. (2018). "GiochiAMO": a school-based smoking and alcohol prevention program for children - a pilot randomized field trial. Part 2. *Annali Di Igiene: Medicina Preventiva E Di Comunita*, *30*(4), 273–284. https://doi.org/10.7416/ai.2018.2219

Saulle, R., Bernardi, M., Chiarini, M., **Backhaus, I.,** & Torre, G. L. (2018). Shift work, overweight and obesity in health professionals: A systematic review and meta-analysis. *La Clinica Terapeutica*, *169*(4), e189–e197.

Weibel, S., Jelting, Y., Pace, N. L., Rücker, G., Raj, D., Schaefer, M. S., **Backhaus, I**. … Kranke, P. (2017). Drugs for preventing postoperative nausea and vomiting in adults after general anaesthesia: A network meta-analysis. In *Cochrane Database of Systematic Reviews*. https://doi.org/10.1002/14651858.CD01285

D'Egidio, V., Sestili, C., Mancino, M., Sciarra, I., Cocchiara, R., **Backhaus, I.**, … RETURN TO BREAST Collaborative group. (2017). Counseling interventions delivered in women with breast cancer to improve health-related quality of life: A systematic review. *Quality of Life*

Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation. https://doi.org/10.1007/s11136-017-1613-6