



**BEHAVIORAL SCIENCE LAB**



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# Historical Time Trends in Loneliness in US Young Adults and Old Adults:

## A Cross-Temporal Meta-Analysis



BEHAVIORAL SCIENCE LAB

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## Conclusions

- No increase of loneliness between 1998 and 2020
- Results largely consistent with two earlier meta-analysis
- The term “loneliness epidemic” is likely not justified.

# Loneliness Matters

The New York Times

## *U.K. Appoints a Minister for Loneliness*

Tracey Crouch, left, Britain's under secretary for sport and civil society, is to coordinate the government's response to loneliness. Stephen Pond/Getty Images for Sport England

By Ceylan Yeginsu

Jan. 17, 2018

**BIG** THINK

THE PRESENT — FEBRUARY 24, 2021

## Japanese government appoints new “Minister of Loneliness”

While not the first such minister, the loneliness epidemic in Japan will make this one the hardest working.

# Our Epidemic of Loneliness and Isolation



# 2023

# Defining Loneliness



# Loneliness and Public Health

Anxiety and depression

Poor sleep

Suicidal ideation and  
behavior

Premature mortality

# Contradictions in prior research

Study	Age group	Time period	Loneliness measure	Results
Trzesniewski & Donnellan (2010)	Adolescents	1976 to 2006	Ad-hoc loneliness scale	Decrease
Twenge et al. (2019)	Adolescents	1976 to 2017	Ad-hoc loneliness scale	Increase
Twenge et al. (2021)	Adolescents	2012 to 2018	Ad-hoc loneliness scale	Increase
Clark et al. (2015)	Young adults	1978 to 2009	UCLA loneliness scale (Revised version)	Decrease
Buecker et al. (2021)	Young adults	1976 to 2019	UCLA loneliness scale (all versions)	Increase
Hawkley et al. (2019)	Old adults	2005 to 2016	UCLA loneliness scale (3-item version)	Stable

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Variations in age group, time period, and loneliness measure across studies make any comparisons difficult



## The present study

*Goal: Estimating the historical time trends in loneliness in US young adults  
and old adults*

## Present Study

**Design: Cross-temporal  
meta-analysis**

**No strong priors (given contradictory data)**

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Even in last three studies, where measures were comparable, contradictory results

## The UCLA loneliness scale

### Developing a measure of **loneliness**

[D Russell](#), [LA Peplau](#), [ML Ferguson](#) - *Journal of personality ...*, 1978 - Taylor & Francis

... The present article reports the development of a short and highly reliable general **loneliness scale** that appears to have concurrent and construct validity, based on several criteria. ...

☆ Enregistrer [Citer](#) Cité 2184 fois [Autres articles](#) [Les 9 versions](#)

### The revised UCLA **Loneliness Scale**: concurrent and discriminant validity evidence.

[D Russell](#), [LA Peplau](#), [CE Cutrona](#) - *Journal of personality and ...*, 1980 - [psycnet.apa.org](#)

... on the **loneliness scale** and other indicators of **loneliness**, social ... **Loneliness Scale** as a measure and has begun to provide a more detailed description of the experience of **loneliness**...

☆ Enregistrer [Citer](#) Cité 5778 fois [Autres articles](#) [Les 20 versions](#)

### **UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure**

[DW Russell](#) - *Journal of personality assessment*, 1996 - Taylor & Francis

... 1:: this article 1 evaluated the psychometric properties of the **UCLA Loneliness Scale (Version 3)**. Using data from prior studies of college students: nurses, teachers, and the elderly. ...

☆ Enregistrer [Citer](#) Cité 4810 fois [Autres articles](#) [Les 9 versions](#)

Acceptable psychometric properties  
(converging and diverging validity; internal  
coherence; test-retest reliability)

Focus

## Literature search

Citation track of Russel (1996)  
on Google Scholar

## Inclusion criteria

Studies were written in English or French

Studies assessed loneliness with the UCLA 3  
loneliness scale

Studies sampled US young adults (18 to 29  
years old) or US old adults (60 years old and  
above)

Studies reported their sample size, mean  
loneliness score, and standard deviation

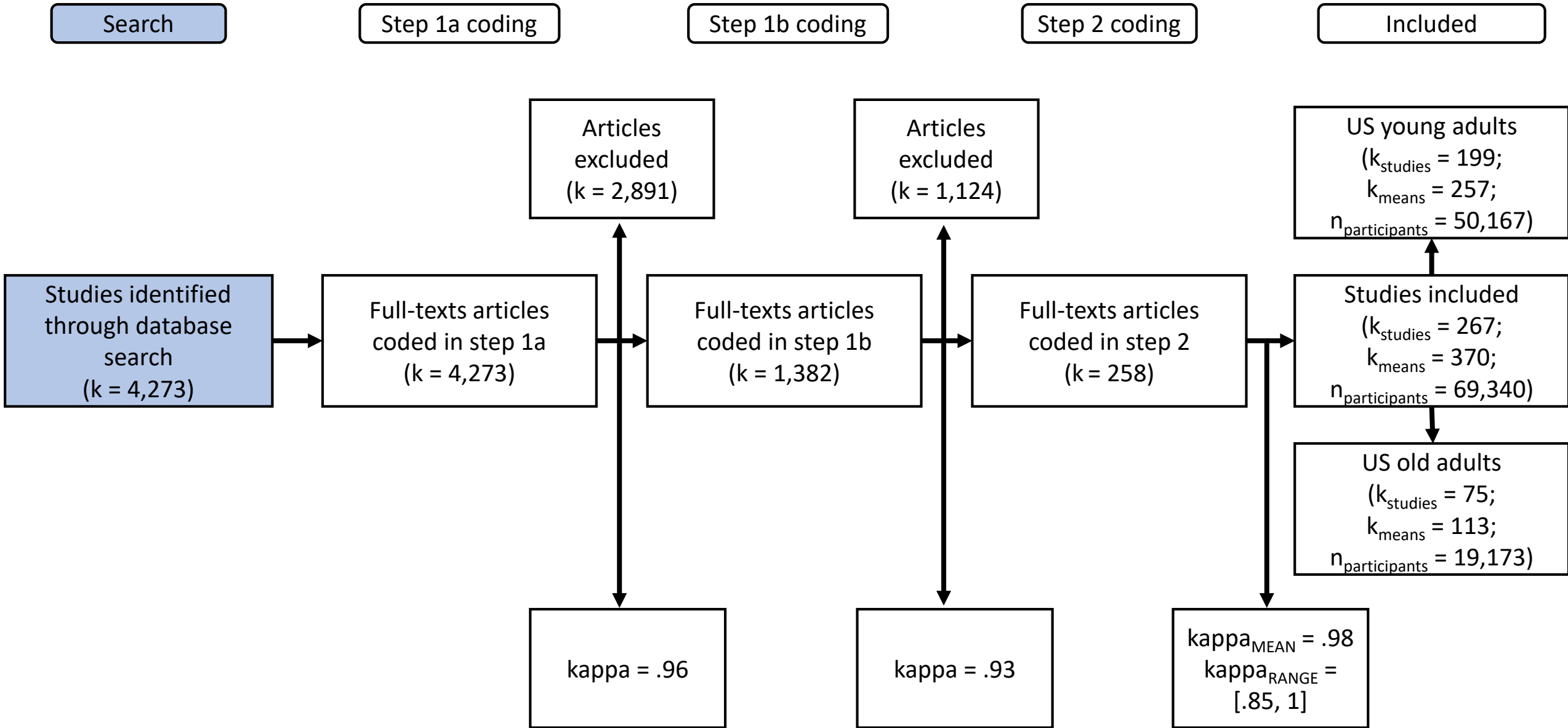
Studies included a sample not used in another  
study

Studies did not preselect their participants  
based on their loneliness scores

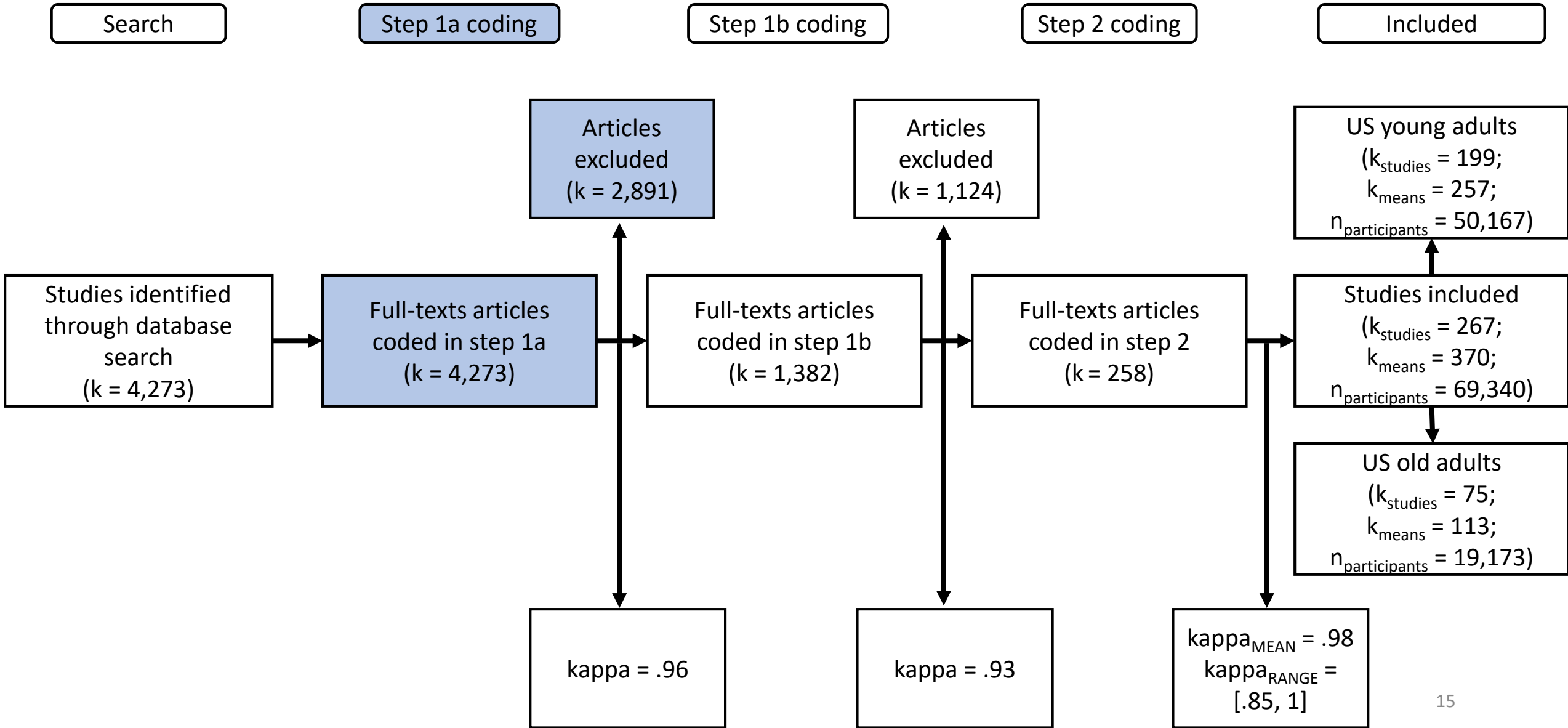
Studies did not collect data over multiple years

Studies were not case studies

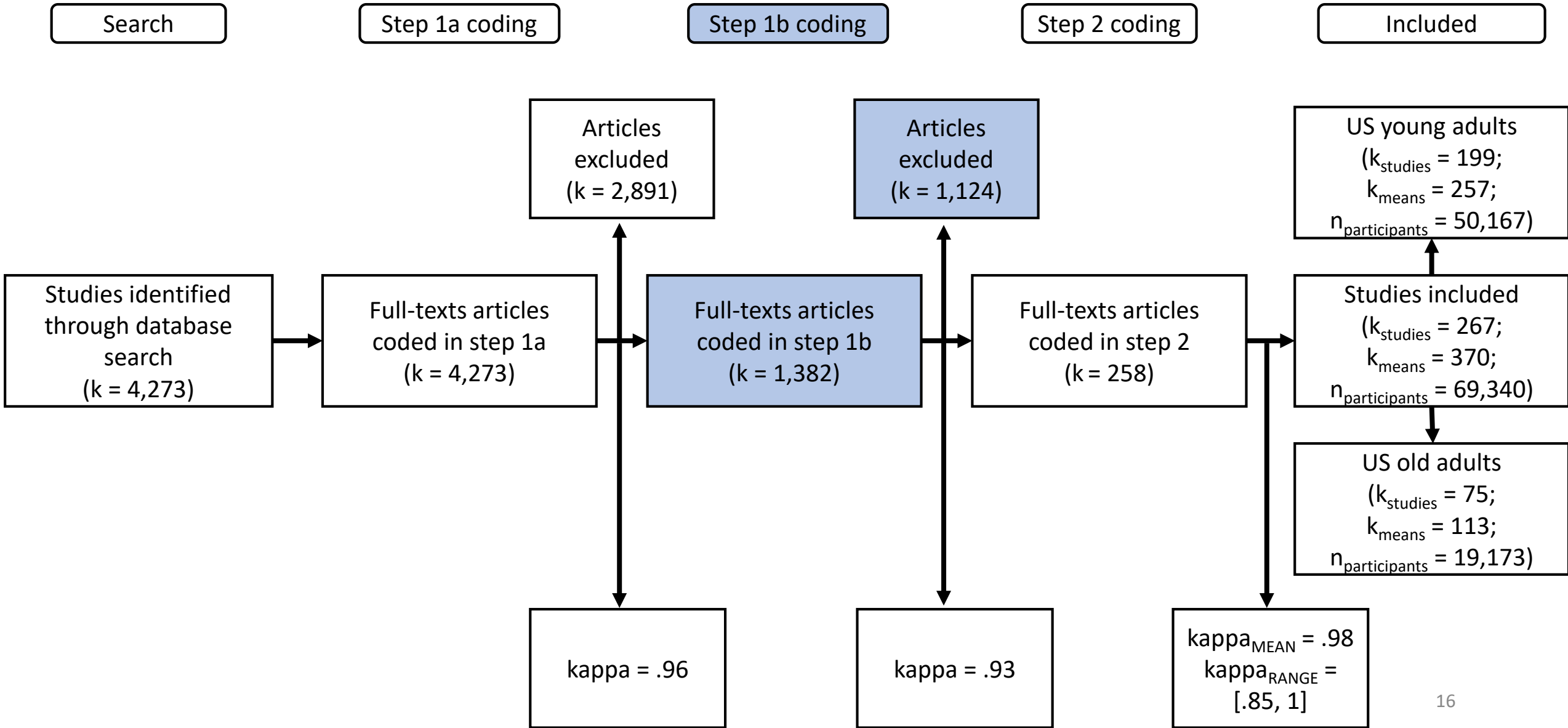
# Literature Search & Inclusion Criteria



# Coding procedure



# Coding procedure





# Coding procedure

## Main variables extracted

Year of data collection

Sample mean loneliness score and standard deviation

Sample size

## Secondary variables extracted

Sample type (specific population sampled)

Sample mean age

Sample female percentage

Scale internal consistency (Cronbach alpha)

Scale administration mode (whether it was in a written or in an oral manner)

Labels of response options of the scale

Number of response options on the scale

Scale completeness (whether the authors used the 20 items or not)

Step 2 coding

Included

Articles included (k = 1,124)

Full-texts articles coded in step 2 (k = 258)

US young adults (k<sub>studies</sub> = 199; k<sub>means</sub> = 257; n<sub>participants</sub> = 50,167)

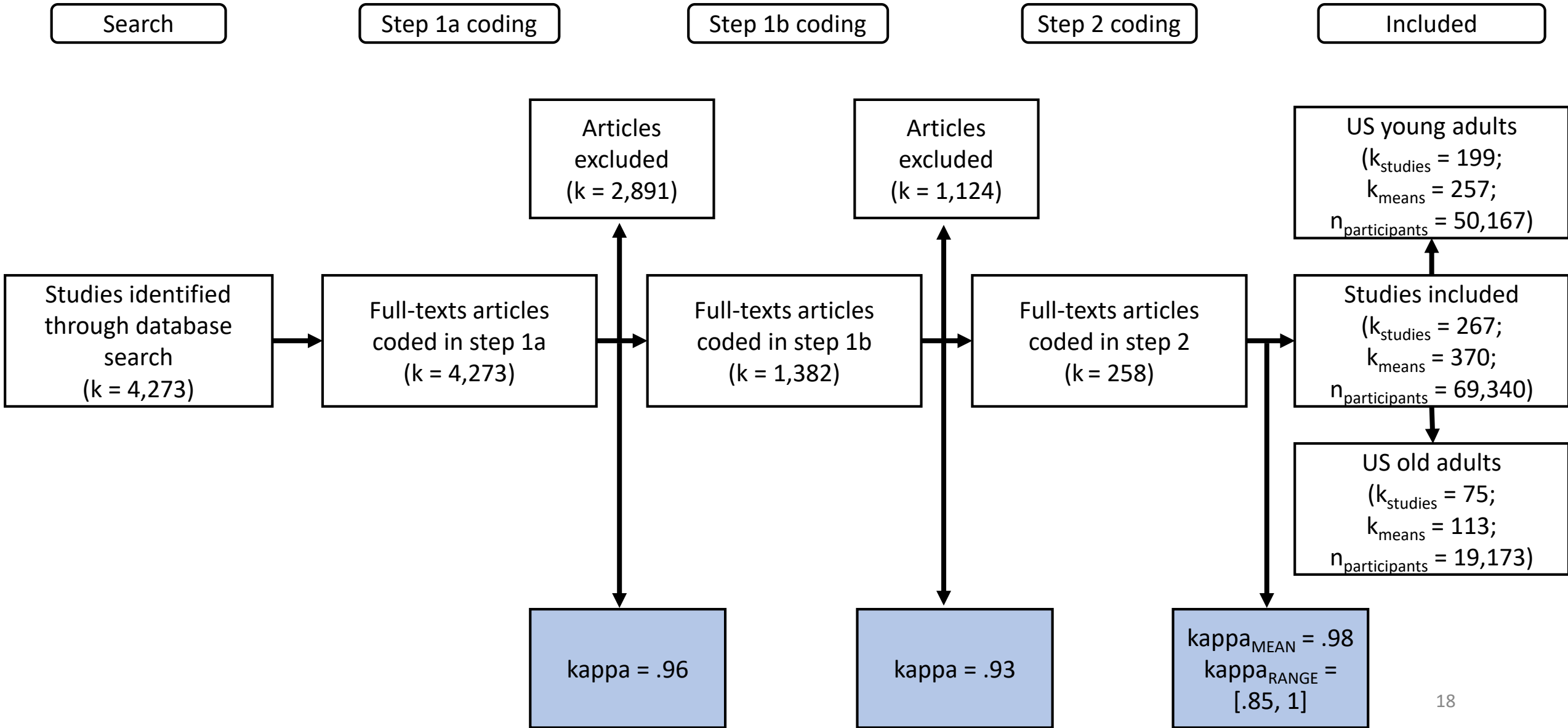
Studies included (k<sub>studies</sub> = 267; k<sub>means</sub> = 370; n<sub>participants</sub> = 69,340)

US old adults (k<sub>studies</sub> = 75; k<sub>means</sub> = 113; n<sub>participants</sub> = 19,173)

Cronbach alpha = .93

kappa<sub>MEAN</sub> = .98  
kappa<sub>RANGE</sub> = [.85, 1]

# Coding procedure



# Data imputation and transformation

## Data imputation

Year of data collection =  
year of publication MINUS  
2 (if not reported)

## Data transformation

Conversion of mean  
scores to sum scores

Score reversion when  
required

Conversion of scores to  
their equivalent on the  
original scale when  
required\*

$$*X_{2MEAN} = \left( (X_{1MEAN} - Min_1) \times \left( \frac{Max_2 - Min_2}{Max_1 - Min_1} \right) \right) + Min_2$$
$$X_{2VARIANCE} = (X_{1STANDARD DEVIATION})^2 \times \left( \frac{Max_2 - Min_2}{Max_1 - Min_1} \right)$$

# Meta-analytic procedure

Predictor: Year of data collection

Dependent variable: Mean loneliness score

Random effects meta-regression with cluster robust variance estimates

Assumes that the true mean loneliness scores estimated in each sample are not identical

Mean loneliness scores have different weights in the regression (inverse variance weighting)

Quantifies heterogeneity in mean loneliness scores ( $Q$ -test;  $\text{TAU}^2$ ;  $I^2$ )

Accounts for the **dependency** in mean loneliness scores that occurs at the year of data collection level due to:

**Nesting within year of data collection**

**Studies reporting multiple sample means**

Metafor R package (version 3.4.0)

ClubSandwich R package (version 0.5.6)

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# Description of the samples included

Year of data collection  
span 1998 to 2020

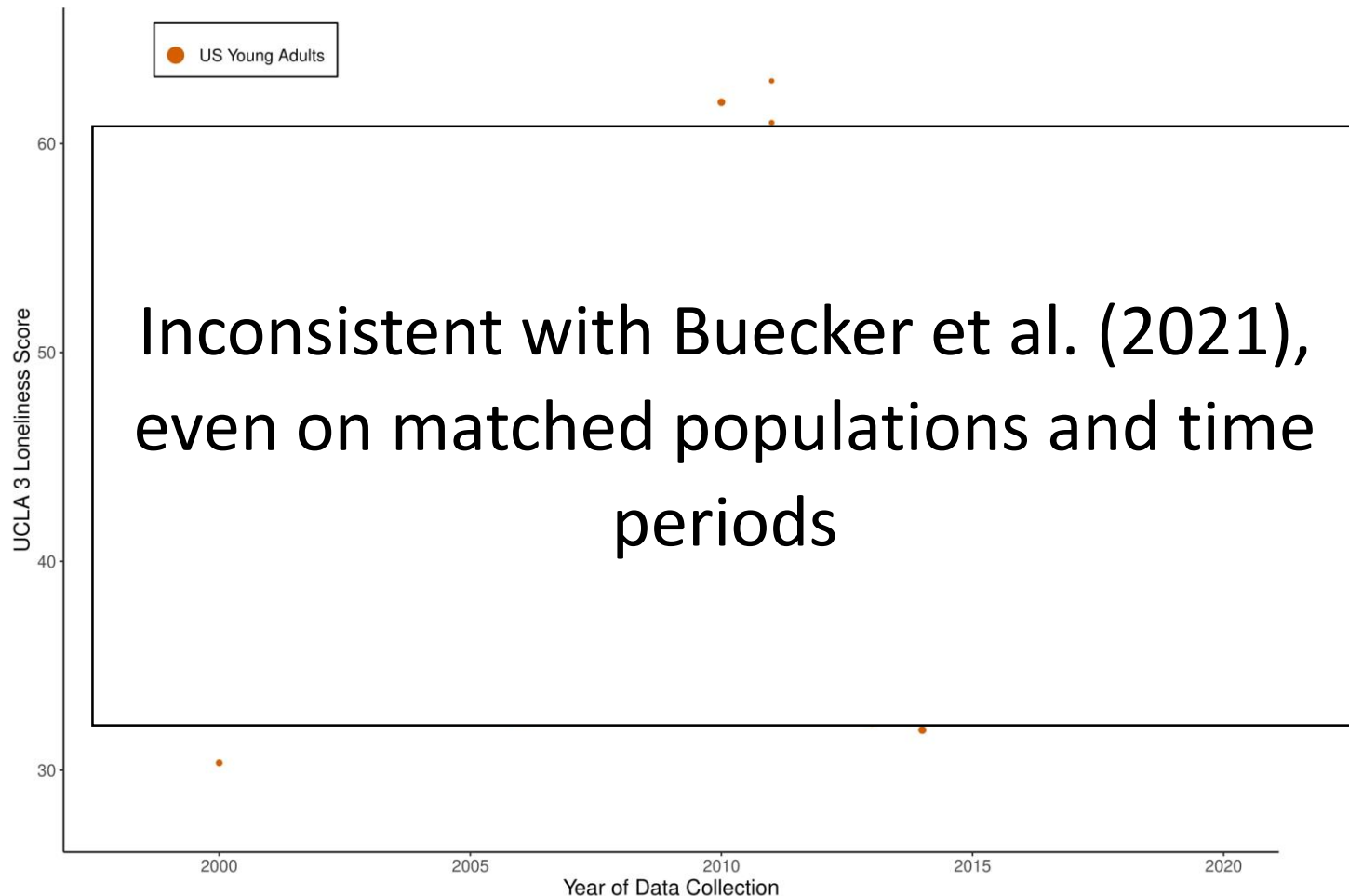
All data	
$k_{\text{studies}} = 267$	
151 journal articles	107 dissertations and theses
$k_{\text{means}} = 370$	
$n_{\text{participants}} = 69,340$	

US young adults
$k_{\text{studies}} = 199$ $k_{\text{means}} = 257$ $n_{\text{participants}} = 50,167$
$M_{\text{AGE}} = 20.82$ $M_{\text{CRONBACH}} = .91$ Samples are relatively <b>homogeneous</b> (90.27% of university students samples)

US old adults
$k_{\text{studies}} = 75$ $k_{\text{means}} = 113$ $n_{\text{participants}} = 19,173$
$M_{\text{AGE}} = 74.07$ $M_{\text{CRONBACH}} = .88$ Samples are relatively <b>heterogeneous</b> (even at within study level)

# Results for US young adults (main analysis)

$$\widehat{\text{Mean loneliness score}} = b_0 + b_1 \text{Year of data collection}$$



## Heterogeneity

$Q(255) = 20285.23, p < .001$  **S**

$\tau^2 = 22.34$

$I^2 = 98.03\%$

## Parameter testing

$b_1 = 0.04, 95\% \text{ CI } [-0.09, 0.16]$  **NS**



# Results for US young adults (controlling for study characteristics)

$$\text{Mean loneliness score} = b_0 + b_1 \text{Year of data collection} + b_2 \text{Covariate}$$

Mean-centered

Mean-centered (continuous covariates)  
Dummy-coded (dichotomic covariates)

Italicized categories are reference categories

Covariate	$b_1$		$b_2$	
Sample type ( <i>university students</i> vs. other)	$b_1 = 0.03$ , 95% CI [-0.08, 0.15]	NS	$b_2 = 4.13$ , 95% CI [-0.48, 8.73]	NS
Sample mean age (continuous)	$b_1 = 0.05$ , 95% CI [-0.05, 0.15]	NS	$b_2 = 0.22$ , 95% CI [-0.27, 0.70]	NS
Sample female percentage (continuous)	$b_1 = 0.06$ , 95% CI [-0.06, 0.18]	NS	$b_2 = -0.02$ , 95% CI [-2.18, 2.14]	NS
Scale internal consistency (continuous)	$b_1 = 0.08$ , 95% CI [-0.05, 0.21]	NS	$b_2 = -3.08$ , 95% CI [-19.63, 13.47]	NS
Scale administration mode ( <i>written</i> vs. oral)	Not enough samples to run the model			
Labels of response options of the scale ( <i>original</i> vs. alternative)	$b_1 = 0.03$ , 95% CI [-0.09, 0.16]	NS	$b_2 = 0.40$ , 95% CI [-1.37, 2.17]	NS
Number of response options on the scale ( <i>original</i> vs. alternative)	$b_1 = 0.04$ , 95% CI [-0.09, 0.16]	NS	$b_2 = 0.52$ , 95% CI [-2.13, 3.16]	NS
Scale completeness ( <i>complete</i> vs. incomplete)	$b_1 = 0.04$ , 95% CI [-0.09, 0.16]	NS	$b_2 = -1.46$ , 95% CI [-5.08, 2.15]	NS

## Results for US young adults (moderator analyses)

$$\widehat{\text{Mean loneliness score}} = b_0 + b_1 \text{Year of data collection} + b_2 \text{Sample type} + b_3 \text{Year of data collection} * \text{Sample type}$$

University students (reference category) vs. other

Historical time trends in loneliness are the same across the different populations of the young adults age group studied here

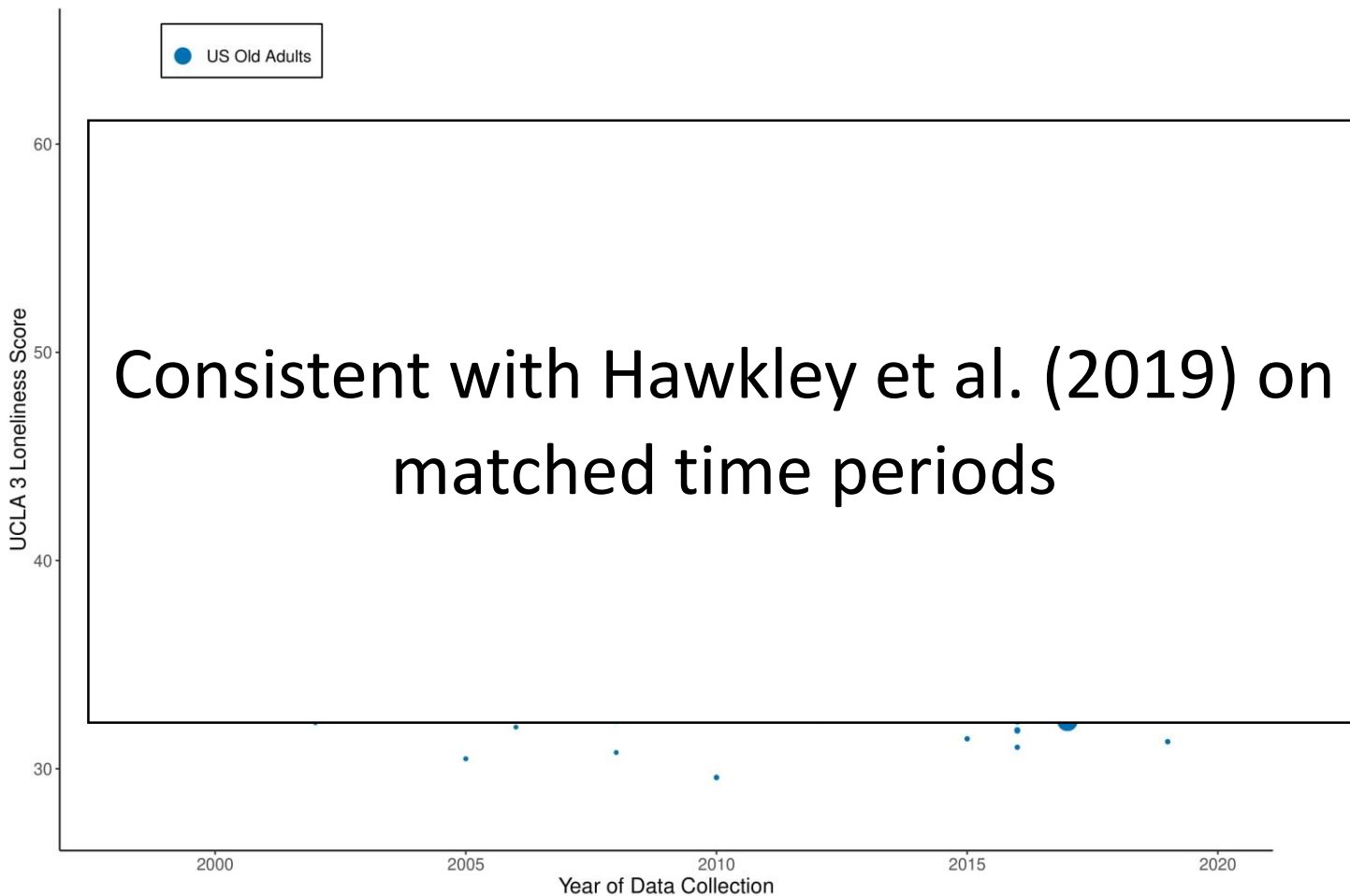
Parameter testing

$b_3 = -0.18, 95\% \text{ CI } [-1.35, 0.98]$

NS

# Results for US old adults (main analysis)

$$\widehat{\text{Mean loneliness score}} = b_0 + b_1 \text{Year of data collection}$$



## Heterogeneity

$Q(111) = 7135.64, p < .001$  **S**

$\tau^2 = 21.78$

$I^2 = 97.77\%$

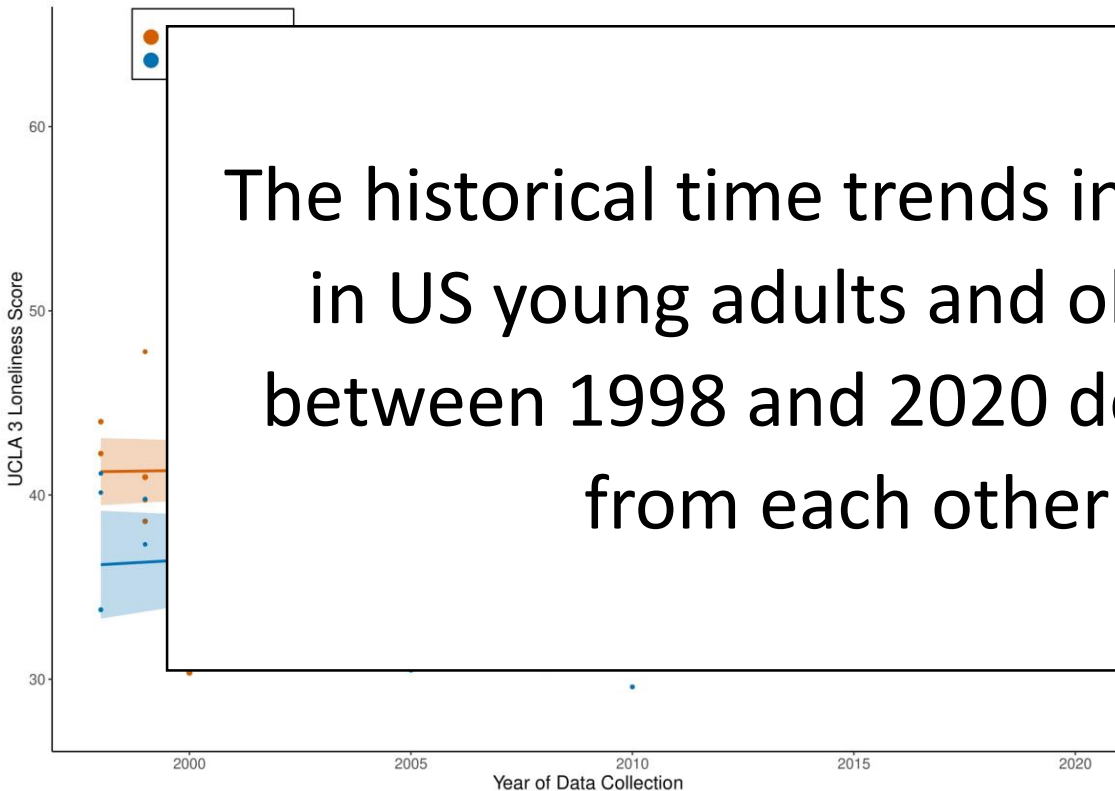
## Parameter testing

$b_1 = 0.14, 95\% \text{ CI } [-0.17, 0.44]$  **NS**

# Comparing historical time trends in loneliness between US young adults and old adults

$$\widehat{\text{Mean loneliness score}} = b_0 + b_1 \text{Year of data collection} + b_2 \text{Age group} + b_3 \text{Year of data collection} * \text{Age group}$$

Young adults (reference category) vs. old adults



The historical time trends in loneliness in US young adults and old adults between 1998 and 2020 don't differ from each other

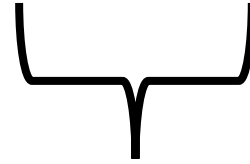
Parameter testing

$$b_3 = 0.10, 95\% \text{ CI } [-0.20, 0.40]$$

NS

# Assessing publication bias

$$\text{Mean loneliness score} = b_0 + b_1 \text{Year of data collection} + b_2 \text{Manuscript type} + b_3 \text{Year of data collection} * \text{Manuscript type}$$



Journal articles (reference category) vs. dissertations and theses

The historical time trends found in the present work don't seem to vary across manuscript types, for both young adults and old adults

Parameter testing (young adults)

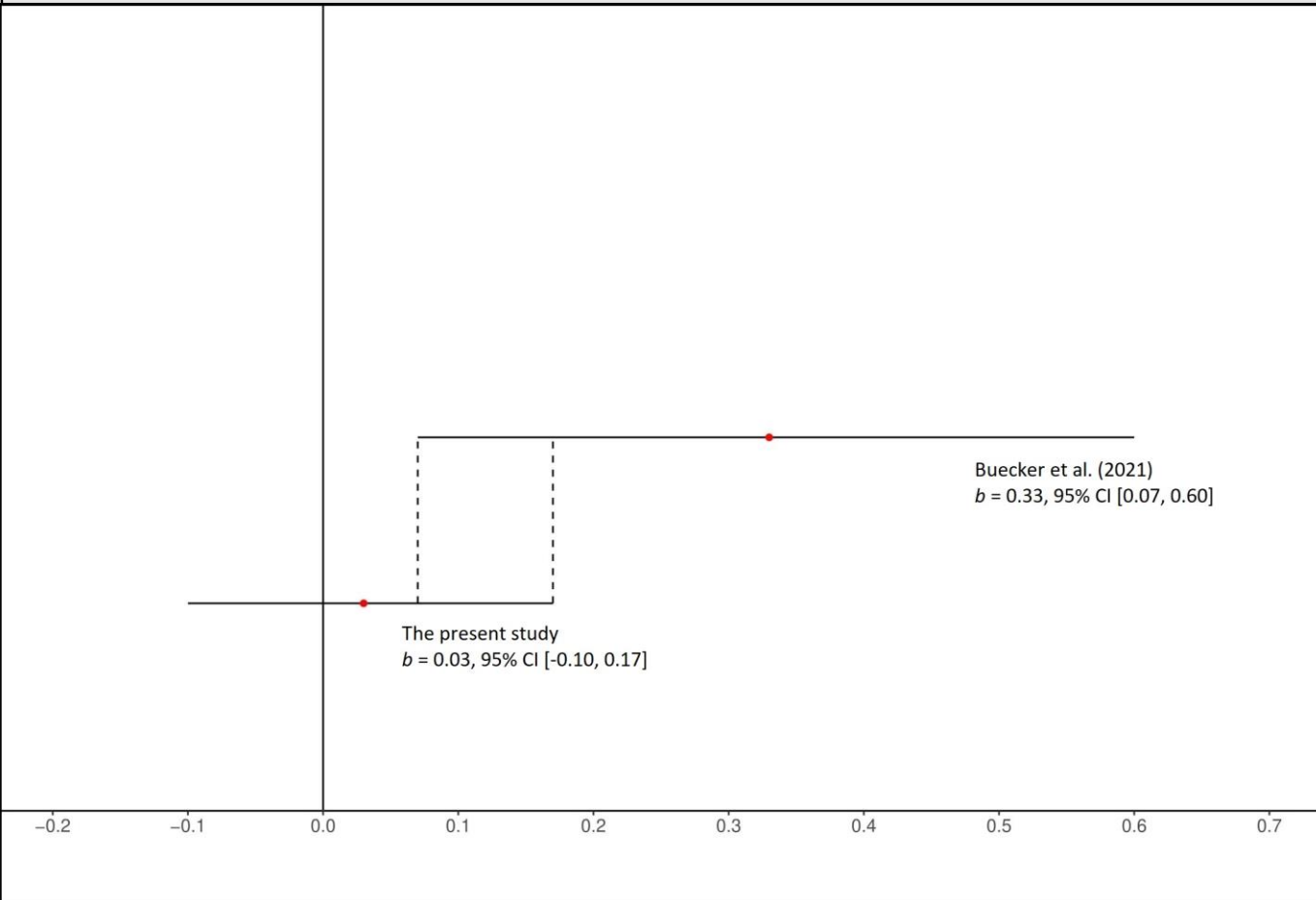
$b_3 = -0.07$ , 95% CI [-0.33, 0.19] **NS**

Parameter testing (old adults)

$b_3 = -0.37$ , 95% CI [-0.76, 0.02] **NS**

Results are not that inconsistent if we look at the effect sizes and their 95% confidence intervals

Contradictory Findings?



# Conclusions

Psychology Today

SCIENTIFIC  
AMERICAN.

LONELINESS

BEHAVIOR | OPINION

## Combating the Pandemic of Why Young Americans Are Lonely

Psychology Today

... can do about it

The deeper meaning of kindness **LONELINESS**

Posted August 9, 2022 |  Reviewed by Lybi Ma

## Why Loneliness Is on the Rise

... ilock on July 27, 2020

30 percent of millennials feel lonely most of the time.

Posted December 3, 2021 |  Reviewed by Tyler Woods

# Conclusions

Psychology Today

SCIENTIFIC  
AMERICAN

*Journal of Advanced Nursing* 1998, (4), 762–770

*Integrative literature reviews and meta-analyses*

# Lonely

## **Loneliness: an epidemic in modern society**

Colin Killeen BSc (Hon) MSc RGN

*Charge Nurse, Elderly Unit, Hope Hospital, Salford, England*

Accepted for publication 5 September 1997

KILLEEN C. (1998) *Journal of Advanced Nursing* **28**(4), 762–770

### **Loneliness: an epidemic in modern society**

Loneliness is a little discussed concept in today's self-obsessed climate, where it is seen as a negative embarrassing condition. It is unique for every individual, and as such, it is difficult to define. There are other closely related concepts for example aloneness and solitude that further complicate



# Conclusions

- Loneliness in US younger and older adults have remained stable

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- Designation of pandemic (or epidemic) – based on these observations – not justified

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Epidemic: “an unexpected increase in the number of disease cases in a specific geographical area”

The World Health Organization “declares a pandemic when a disease’s growth is exponential”.

# Conclusions

- Designation of pandemic (or epidemic) – based on these observations – not justified
- Measurement matters – may misdiagnose the cause if we misdiagnose the numbers

# Conclusions

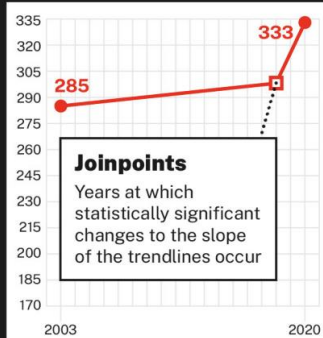
- Designation of pandemic (or epidemic) – based on these observations – not justified
- Measurement matters – may misdiagnose the cause if we misdiagnose the numbers
- If not a pandemic – is loneliness not important?
  - Other public health matters (e.g., cancer)

# Limitations

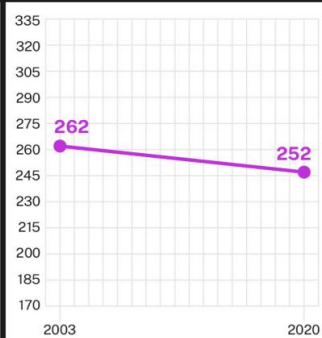
- We don't find changes, but retrospective design makes causal inferences difficult
- UCLA Loneliness Scale – no known tests of longitudinal invariance
- We are unable to observe distributional changes
- Our work was focused on the US and inferences limited to the US

# Maybe we are wrong

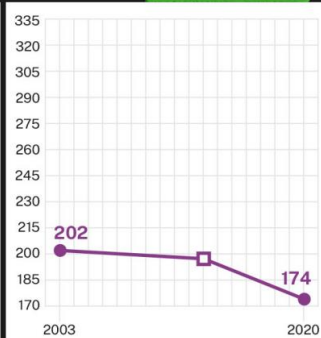
ANNUAL DAILY AVERAGE IN MINUTES



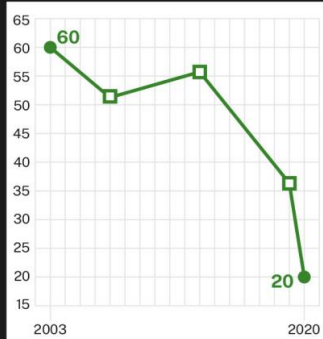
**Social Isolation**  
an increase of **24 hours** per month



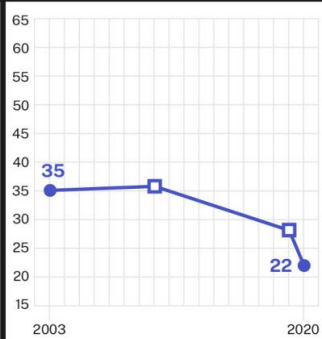
**Household Family Social Engagement**  
a decrease of **5 hours** per month



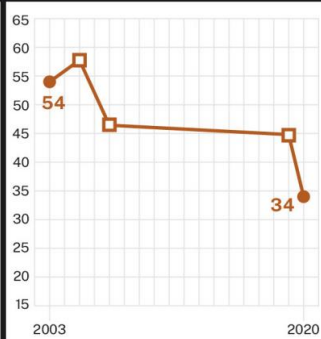
**Companionship**  
a decrease of **14 hours** per month  
Companionship refers to shared leisure for the sake of enjoyment and intrinsic satisfaction



**Social Engagement with Friends**  
a decrease of **20 hours** per month



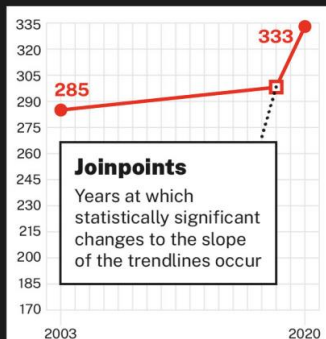
**Non-Household Family Social Engagement**  
a decrease of **6.5 hours** per month



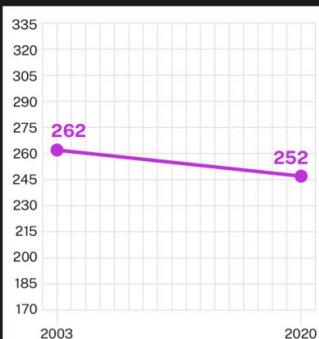
**Social Engagement with Others**  
a decrease of **10 hours** per month

# Maybe we are wrong

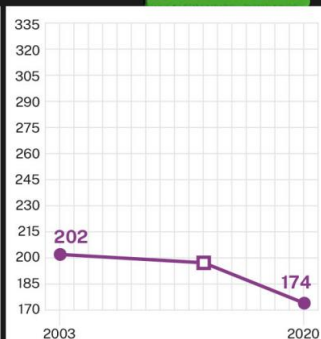
ANNUAL DAILY AVERAGE IN MINUTES



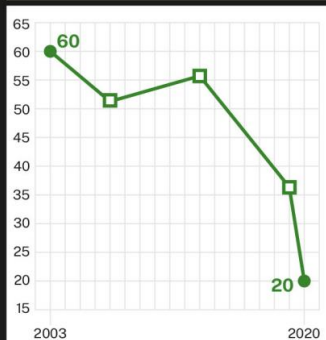
**Social Isolation**  
an increase of **24 hours** per month



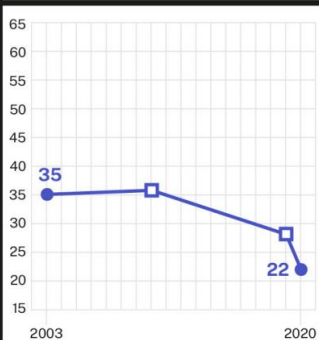
**Household Family Social Engagement**  
a decrease of **5 hours** per month



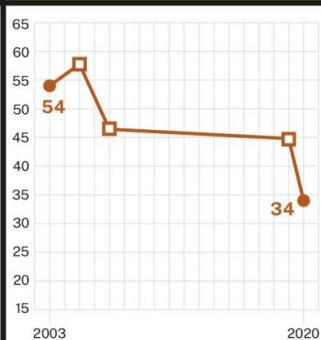
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**Non-Household Family Social Engagement**  
a decrease of **6.5 hours** per month



**Social Engagement with Others**  
a decrease of **10 hours** per month

- Out of the 267 studies included in the study, only one had representative samples (one sample for young adults, one sample for old adults)
- Samples for young adults were mostly university students (90.27%).
- For older adults, quite heterogeneous



# Conclusions

- Cause of the differences:
  - Measurement error?
  - Sampling?
  - Narrow focus on loneliness?

Thank you



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