1   Investigating Differences in the Associations Between Violent Crime Rates and Physical

2   Inactivity Among Counties Across California.

3   Jonathan A. Pedroza[1,2]

4   [1] University of Oregon

5   [2] Prevention Science Institute

6   Author Note

7   Counseling and Human Services

8   Correspondence concerning this article should be addressed to Jonathan A. Pedroza,

9 1600 Millrace Dr., Eugene OR, 97403. E-mail: jpedroza@uoregon.edu

...

10   Abstract

11   Background: A large proportion of adults in California are not meeting the recommended

12   amounts of leisure-time physical activity, which is a risk afctor for cardiovascular disease

13   and other chronic health conditions. One barrier for these low levels of physical activity is

14   higher violent crime rates. Thus, the aims of this study were 1) to examine if the

15   association between violent crime rates and physical inactivity differs across California

16   counties and 2) to investigate if violent crime rates is associated with more physical

17   inactivity in California.

18   Method: Violent crime rates and physical inactivity data for all 58 California counties

19   from 2011-2019 from the County Health Rankings and Roadmaps website were included in

20   this study. A multi-level model was conducted while adjusting for county-level median

21   household income, rurality, adult obesity rates, and county population.

22   Results: The association of violent crime rates on physical inactivity did not differ

23   across California counties ($p = .064$). However, there was some variation among counties

24   physical inactivity levels ($\sigma^2 = .06$). In support of the second aim, state-level violent crime

25   rates were associated with an increase in physical inactivity ($b = .08$, $p = .01$).

26   Conclusion: While no differences across violent crime rate and physical inactivity

27   among California counties were found, the significant association between violent crime rate

28   and physical inactivity at the state level suggests that addressing violent crime rates may

29   reduce physical inactivity in California. Implications for this study are further discussed.

30   *Keywords:* physical inactivity, crime, California, county level

31   Word count: X

32   Investigating Differences in the Associations Between Violent Crime Rates and Physical

33   Inactivity Among Counties Across California.

34   ## Warning: package 'tidyverse' was built under R version 3.5.3

35   ## Warning: package 'ggplot2' was built under R version 3.5.3

36   ## Warning: package 'tibble' was built under R version 3.5.3

37   ## Warning: package 'tidyr' was built under R version 3.5.3

38   ## Warning: package 'readr' was built under R version 3.5.3

39   ## Warning: package 'purrr' was built under R version 3.5.3

40   ## Warning: package 'dplyr' was built under R version 3.5.3

41   ## Warning: package 'stringr' was built under R version 3.5.2

42   ## Warning: package 'forcats' was built under R version 3.5.3

43   ## Warning: package 'inspectdf' was built under R version 3.5.3

44   ## Warning: package 'psych' was built under R version 3.5.3

45   ## Warning: package 'lme4' was built under R version 3.5.3

46   ## Warning: package 'lmerTest' was built under R version 3.5.3

47   ## [1] "E:/UO/R Projects/SOC 613/scripts"

Methods

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Participants

Material

Procedure

Data analysis

We used R (Version 3.5.1; R Core Team, 2018) and the R-packages *dplyr* (Version 0.8.3; Wickham et al., 2019), *forcats* (Version 0.4.0; Wickham, 2019a), *ggplot2* (Version 3.2.1; Wickham, 2016), *inspectdf* (Version 0.0.3; Rushworth, 2019), *lme4* (Version 1.1.21; Bates, Mächler, Bolker, & Walker, 2015), *lmerTest* (Version 3.1.1; Kuznetsova, Brockhoff, & Christensen, 2017), *Matrix* (Version 1.2.14; Bates & Maechler, 2018), *papaja* (Version 0.1.0.9842; Aust & Barth, 2018), *psych* (Version 1.8.12; Revelle, 2018), *purrr* (Version 0.3.3; Henry & Wickham, 2019), *readr* (Version 1.3.1; Wickham, Hester, & Francois, 2018), *stringr* (Version 1.4.0; Wickham, 2019b), *tibble* (Version 2.1.3; Müller & Wickham, 2019), *tidyr* (Version 1.0.2; Wickham & Henry, 2020), and *tidyverse* (Version 1.3.0; Wickham, Averick, et al., 2019) for all our analyses.

Results

```
##                    Variable Overall Year_2011 Year_2012 Year_2013 Year_2014
## 1            Obesity Rates      XX        XX        XX        XX        XX
## 2         Percent Rurality      XX        XX        XX        XX        XX
## 3 Median Household Income      XX        XX        XX        XX        XX
```

```
## 4              Population       XX       XX       XX       XX       XX
## 5   Violent Crime Rates       XX       XX       XX       XX       XX
## 6   Physical Inactivity       XX       XX       XX       XX       XX
##   Year_2015 Year_2016 Year_2017 Year_2018 Year_2019
## 1        XX        XX        XX        XX        XX
## 2        XX        XX        XX        XX        XX
## 3        XX        XX        XX        XX        XX
## 4        XX        XX        XX        XX        XX
## 5        XX        XX        XX        XX        XX
## 6        XX        XX        XX        XX        XX
```

```
##                             Variable       Model1
## 1                                   No Predictors
## 2            Fixed effect estimates
## 3                            Intercept  value and CI
## 4                          Adult Obesity  value and CI
## 5                        Percent Rurality  value and CI
## 6                 Median Household Income  value and CI
## 7                             Population  value and CI
## 8                           Release Year  value and CI
## 9                          Violent Crime  value and CI
## 10            Random effect estimates
## 11                               County  value and CI
## 12                          Violent Crime
## 13            Fit statistics
## 14                              AIC/BIC    fit values
## 15 Intraclass correlation coefficient
## 16                               County          ICC
```

```
##                          Model2         Model3
## 1  County-Level Predictors Random Slopes
## 2
## 3               value and CI  value and CI
## 4               value and CI  value and CI
## 5               value and CI  value and CI
## 6               value and CI  value and CI
## 7               value and CI  value and CI
## 8               value and CI  value and CI
## 9               value and CI  value and CI
## 10
## 11              value and CI  value and CI
## 12                            value and CI
## 13
## 14                 fit values    fit values
## 15
## 16                     ICC
```

Discussion

References

Aust, F., & Barth, M. (2018). *papaja: Create APA manuscripts with R Markdown.* Retrieved from https://github.com/crsh/papaja

Bates, D., & Maechler, M. (2018). *Matrix: Sparse and dense matrix classes and methods.* Retrieved from https://CRAN.R-project.org/package=Matrix

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software, 67*(1), 1–48. doi:10.18637/jss.v067.i01

Henry, L., & Wickham, H. (2019). *Purrr: Functional programming tools.* Retrieved from https://CRAN.R-project.org/package=purrr

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest package: Tests in linear mixed effects models. *Journal of Statistical Software, 82*(13), 1–26. doi:10.18637/jss.v082.i13

Müller, K., & Wickham, H. (2019). *Tibble: Simple data frames.* Retrieved from https://CRAN.R-project.org/package=tibble

R Core Team. (2018). *R: A language and environment for statistical computing.* Vienna, Austria: R Foundation for Statistical Computing. Retrieved from https://www.R-project.org/

Revelle, W. (2018). *Psych: Procedures for psychological, psychometric, and personality research.* Evanston, Illinois: Northwestern University. Retrieved from https://CRAN.R-project.org/package=psych

Rushworth, A. (2019). *Inspectdf: Inspection, comparison and visualisation of data frames.* Retrieved from https://CRAN.R-project.org/package=inspectdf

Wickham, H. (2016). *Ggplot2: Elegant graphics for data analysis.* Springer-Verlag New York. Retrieved from https://ggplot2.tidyverse.org

139 Wickham, H. (2019a). *Forcats: Tools for working with categorical variables (factors).*

140   Retrieved from https://CRAN.R-project.org/package=forcats

141 Wickham, H. (2019b). *Stringr: Simple, consistent wrappers for common string operations.*

142   Retrieved from https://CRAN.R-project.org/package=stringr

143 Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R., . . .

144   Yutani, H. (2019). Welcome to the tidyverse. *Journal of Open Source Software,*

145   *4*(43), 1686. doi:10.21105/joss.01686

146 Wickham, H., François, R., Henry, L., & Müller, K. (2019). *Dplyr: A grammar of data*

147   *manipulation.* Retrieved from https://CRAN.R-project.org/package=dplyr

148 Wickham, H., & Henry, L. (2020). *Tidyr: Tidy messy data.* Retrieved from

149   https://CRAN.R-project.org/package=tidyr

150 Wickham, H., Hester, J., & Francois, R. (2018). *Readr: Read rectangular text data.*

151   Retrieved from https://CRAN.R-project.org/package=readr