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Mirror, mirror on the wall, who's the healthiest of them all – The surprising role of narcissism in state-level health outcomes

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ABSTRACT

This study investigates narcissism's role in state-level health outcomes across the U.S. While often seen as maladaptive, narcissism's adaptive aspects, like self-enhancement, might promote better health. Analyzing data from 4,230 participants in 38 states, we explore the link between dark triad traits (narcissism, Machiavellianism, psychopathy) and health outcomes. States with higher narcissism had lower obesity and depression rates, and a lower likelihood of heart failure and hypertension deaths. However, these states reported less sleep and higher demand for plastic surgeons. This study is the first to provide a nuanced understanding of the complex interplay between dark triad traits and health on the state level, with significant implications for public health policies and interventions.

1. Introduction

Narcissism, often painted with broad strokes of vanity and grandiosity, harbors a deeper complexity than meets the eye. While its maladaptive aspects, such as entitlement and overindulgence, have been extensively critiqued, there lies a silver lining: the adaptive components that may be conducive to positive health outcomes. Rooted in self-enhancement, confidence, and ambition (Back et al., 2010; Cai & Luo, 2018; Watson & Biderman, 1993), narcissism might be an unexpected ally in fostering resilience, efficient stress management, and a proactive approach to self-care (Sedikides et al., 2004; Zuckerman & O'Loughlin, 2009). The allure of an idealized self-image may propel individuals with narcissistic tendencies to pursue regular exercise, adhere to a nutritious diet, and actively engage with preventive healthcare services (Davis et al., 2005; Spano, 2001).

Yet, can these individual behaviors be extrapolated to a larger societal canvas? This study delves into the intriguing hypothesis that regions teeming with narcissistic personalities might portray a healthier demographic landscape, evidenced by reduced obesity rates and increased demand for aesthetic enhancements such as plastic surgery (Blau et al., 2020). However, it is essential to tread this path with caution. The duality of narcissism, with its blend of adaptive and maladaptive traits, can manifest in contrasting health behaviors. The same sense of grandeur that might motivate some towards a healthier lifestyle could lead others to indulge in risky behaviors and substance abuse (Hill, 2016).

In the present article, we shift our lens to the state level within the United States, probing the association between narcissism and a plethora of health outcomes based on a large sample of 4,230 residents across 38 states. The present study stands distinct in its approach, delving into the dark triad traits' societal implications, using archival resources. As we peel back the layers of narcissism, we aim to shed light on its multifaceted influence on health, offering a more nuanced understanding that could reshape public health perspectives and interventions.

1.1. Narcissism and health

The theoretical foundation for the potential benefits of narcissism in health outcomes stems from the adaptive components of narcissism, such as self-enhancement, self-confidence, and ambitious goal-setting (Back et al., 2010; Cai & Luo, 2018; Watson & Biderman, 1993). These features can contribute to an individual's resilience, stress management, and motivation for self-care, which may, in turn, lead to improved health outcomes (Sedikides et al., 2004; Zuckerman & O'Loughlin, 2009). It stands to reason that narcissists are more likely to

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engage in regular physical activity, maintain a balanced diet, and seek preventive healthcare services, driven by their desire to preserve an idealized self-image (Davis et al., 2005; Hill, 2016; Spano, 2001).

In this article, we hypothesize and show that the relationship between narcissism and health-related behaviors also can be seen at an aggregate regional or state level. We hypothesize that regions with a higher prevalence of narcissistic individuals may experience lower rates of obesity and other health-related issues, as the pursuit of an idealized self-image is likely to translate into increased self-care and healthier lifestyles. State-level or regional-level narcissism is also likely to be associated with a prevalence of plastic surgery procedures or demand for plastic surgeons (Blau et al., 2020) as narcissistic individuals are also vain (Wetzel et al., 2020) and therefore could be more likely to undergo cosmetic procedures to enhance their physical appearance. This association should also be visible at the state or regional level.

Yet, despite the positive impact of narcissism on health, it is important to remember that narcissism is a multifaceted construct, encompassing both adaptive and maladaptive aspects. While the adaptive components of narcissism may contribute to positive health outcomes and (e.g.) lower obesity rates, the maladaptive aspects can still pose challenges. For example, narcissistic individuals often exhibit a sense of entitlement and overindulgence, which can lead to unhealthy eating habits, a sedentary lifestyle in some cases, substance abuse, and risky driving behavior (Hill, 2016). The intricate interplay between these opposing facets of narcissism necessitates a comprehensive understanding of how they may interact to shape health outcomes.

This study aimed to investigate the association between narcissism and various health outcomes, diseases, and behaviors at the regional level of analysis within the United States. We hypothesized that narcissism, given its association with self-image and self-enhancement behaviors, would show significant relationships with various health outcomes. We also examined in an exploratory manner whether Machiavellianism and psychopathy would show fewer associations with health outcomes, given their distinct psychological characteristics.

The novelty of this study lies in its exploration of the dark triad traits at a regional level, using archival resources for data collection. This approach broadens our understanding of how these personality traits might influence health outcomes across different populations. The study's focus on narcissism, in particular, offers new insights into how this trait might influence health outcomes and behaviors, both positively and negatively. This could have significant implications for public health policies and the design of targeted interventions.

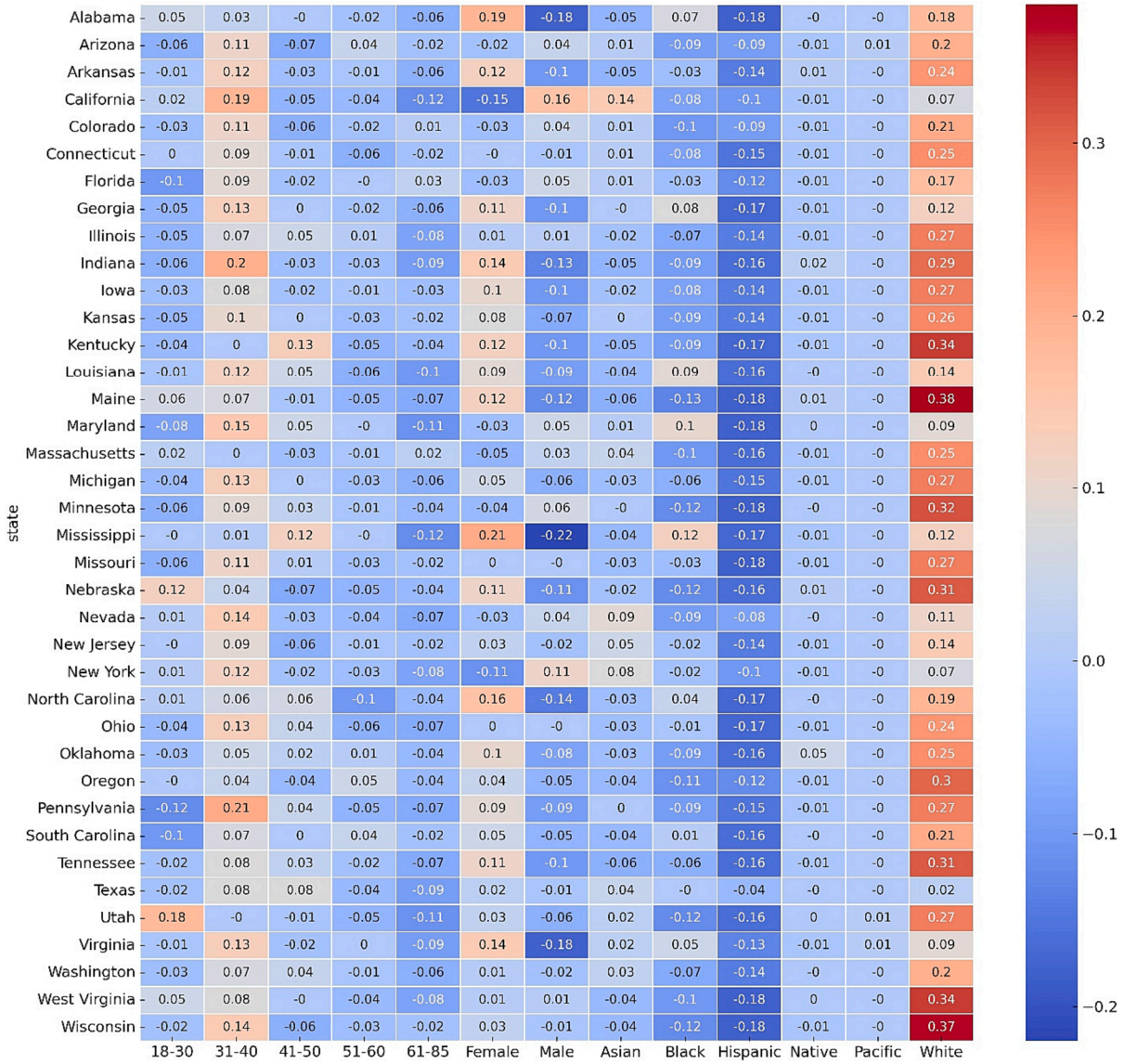

Fig. 1. Demographics comparison heatmap.

2. Materials and methods

2.1. Sample and procedure

To test the relationships between dark triad – health relationships at the regional level of analysis, we first collected narcissism, Machiavellianism, and psychopathy scores from individuals across the US. Participants had to be a minimum of 18 years of age, and reside in the United States. In total, we collected data from 4,230 participants, who were 18 to 85 years of age (M_{age} = 40.36, SD = 12.80; Female: M = 40.94, SD = 13.08; Male: M = 39.96, SD = 12.44). In our sample, 54.15 % of participants identified as female, 44.37 % as male, 1.13 % as other, and 0.35 % preferred not to say. In total, 80.99 % of our sample identified as Caucasian, 8.27 % as African-American, 5.79 % as Asian American, and 3.45 % as Hispanic or Latinx.

To determine representativeness, we compared age intervals, gender, and race/ethnicity per state with U.S. Census (2020) data. To showcase this comparison, we generated a heatmap (Fig. 1). The color scale represents the percentage differences, with blue shades indicating negative values and red shades indicating positive values. The annotations on the heatmap provide the exact values for each state and demographic group.

This comparison indicates we oversampled a younger demographic (i.e., 31–40 years, 9.29 % above Census data) and a higher percentage of Caucasians (22.16 % above Census data) while undersampling Hispanics (14.69 % below Census data). However, in all other examined aspects, our sample seems largely representative of the United States population (+/- 5 %).

The study data was collected via the online survey platform Qualtrics and was conducted following the Declaration of Helsinki ethical principles for research involving human subjects. Participants were recruited via crowdsourcing platforms Amazon Mechanical Turk and Prolific. Prospective participants were shown a brief overview regarding the aims, explanations, and procedures of the study. Below the study overview, we also included a link to an informed consent statement and form, and to the online survey itself subject to their consent. Participants were asked whether they consented to participate in the study; all of them consented to their participation in the study by indicating their consent on the provided informed consent form. The median survey completion time was 2 min. Participation was anonymous, and participants could drop out of the study at any time. Participants could skip questions should they wish to do so. No personally identifiable information was collected. Upon study completion, all participants were debriefed and thanked for their participation.

Given our aim to aggregate individual-level dark triad traits to the state level, we had to ensure a reasonable sample size per state. We aimed for a minimum of 100 observations per state, which was achieved for a total of 38 states (incl. Maine with 98 observations). Results indicated that aggregation to the state-level of analysis was feasible and that the state-level means for the three dark triad factors were reliable (narcissism ICC(2) = 0.80, Machiavellianism ICC(2) = 0.81, psychopathy ICC(2) = 0.87). Pooled within-state (i.e., individual level) correlations among the dark triad measures are reported in Table 1.

Table 1
Pooled within-state (i.e., individual level) correlations among the dark triad measures.

	Narcissism	Machiavellianism
Narcissism	–	
Machiavellianism	0.39	–
Psychopathy	0.46	0.63

Note: This correlation matrix shows the relationships among the dark triad measures once state-level differences are controlled. These correlations are similar to those obtained in prior research using the Short Dark triad trait (SD3) measure.

To showcase differences across states, we generated choropleth maps for each dark triad trait (standardized on the national level). Choropleth maps are provided in Fig. 2, Fig. 3, and Fig. 4. The color scale represents the values, with dark blue indicating higher values and brighter shades of blue indicating lower values.

In terms of narcissism scores, California, Indiana, Florida, and Virginia ranked the highest, while Minnesota, West Virginia, Iowa, and Mississippi were at the bottom. For Machiavellianism, the highest scores were observed in California, Indiana, New York, and New Jersey, while Arizona, Arkansas, Oregon, and Utah recorded the lowest. Lastly, when examining psychopathy, Indiana, California, New York, and Louisiana were the top scorers, with Arizona, Oregon, and Arkansas having the lowest scores.

2.2. Open practices statement

This study was not preregistered. Individual-level data have not been made available on a permanent third-party archive because of institutional review board restrictions. However, aggregated data will be made available upon reasonable request by contacting the corresponding author.

2.3. Measures

Participants completed the Short Dark Triad Questionnaire (see below), a 27-item scale measuring subclinical narcissism, Machiavellianism, and psychopathy, as well as several demographic questions.

2.3.1. Dark triad traits

Dark triad traits were measured using the Short Dark Triad (SD3) scale by (Jones & Paulhus, 2014). Participants indicate their agreement to 27 items (nine items per dark triad trait) on a Likert scale of 1 (“strongly disagree”) to 5 (“strongly agree; narcissism: M = 2.47, SD = 0.73, Machiavellianism: M = 2.94, SD = 0.76, psychopathy: M = 2.02, SD = 0.73). Example items per trait include “I know that I am special because everyone keeps telling me so” (narcissism), “Make sure your plans benefit yourself, not others” (Machiavellianism), and “People who mess with always regret it” (psychopathy). Cronbach alphas for all dark triad traits were acceptable ($\alpha_{narcissism}$ = 0.79, $\alpha_{Machiavellianism}$ = 0.83, $\alpha_{psychopathy}$ = 0.81).

2.3.2. Health outcomes, diseases, and preventative behaviors

The underlying data of this study are both survey-based (e.g., with regard to obesity and depression) and objective health data (e.g., deaths due to hypertension or stroke). Specifically, 400,000 participants in the Behavioral Risk Factor Surveillance Survey (BRFSS; https://www.cdc.gov/brfss/) on which the PLACES dataset is built, were asked if they have been diagnosed with any of a large set of medical conditions by a medical doctor. This is in contrast to most self-report studies, which ask participants to provide self-assessed ratings of (e.g.) depression. We argue that the use of the presented survey data is, albeit not as objective as hospital or health insurance records, nonetheless vital. First, it would be difficult to obtain health insurance records due to HIPAA regulations. In addition, conditions such as depression are unlikely to be treated and brought to the attention of medical professionals unless a patient seeks out medical help. Hence, when it comes to such health outcomes, survey-based data is needed.

Our study also incorporates objective data to mitigate the concern of self-report data. Specifically, the data on deaths due to various medical conditions are based on reports from the Centers for Disease Control and Prevention (CDC). This inclusion of CDC data provides a robust and objective measure of health outcomes, which is less susceptible to the subjective biases that may affect individual self-reports.

By integrating both survey data related to diagnoses and CDC-reported data on mortality, our study achieves a comprehensive and balanced view of health outcomes. The mix between subjective and

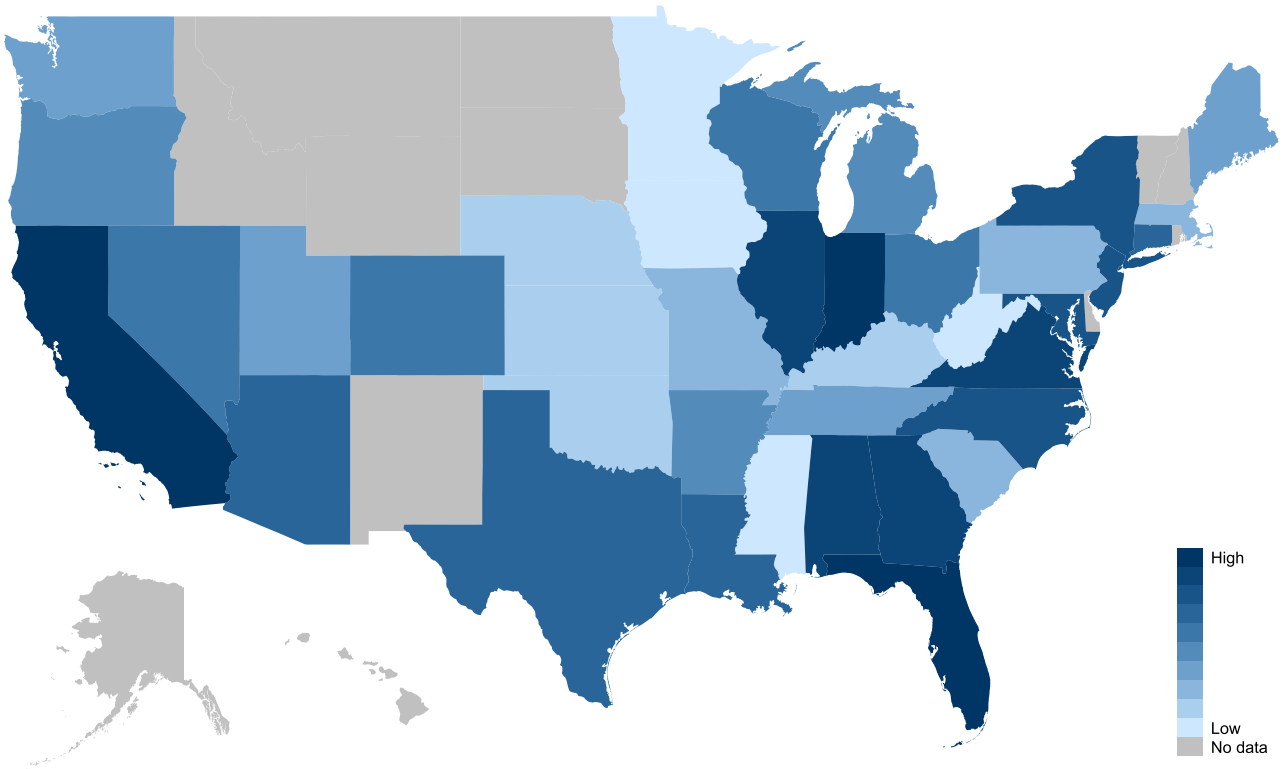

Fig. 2. Overview of (standardized) narcissism scores across states.

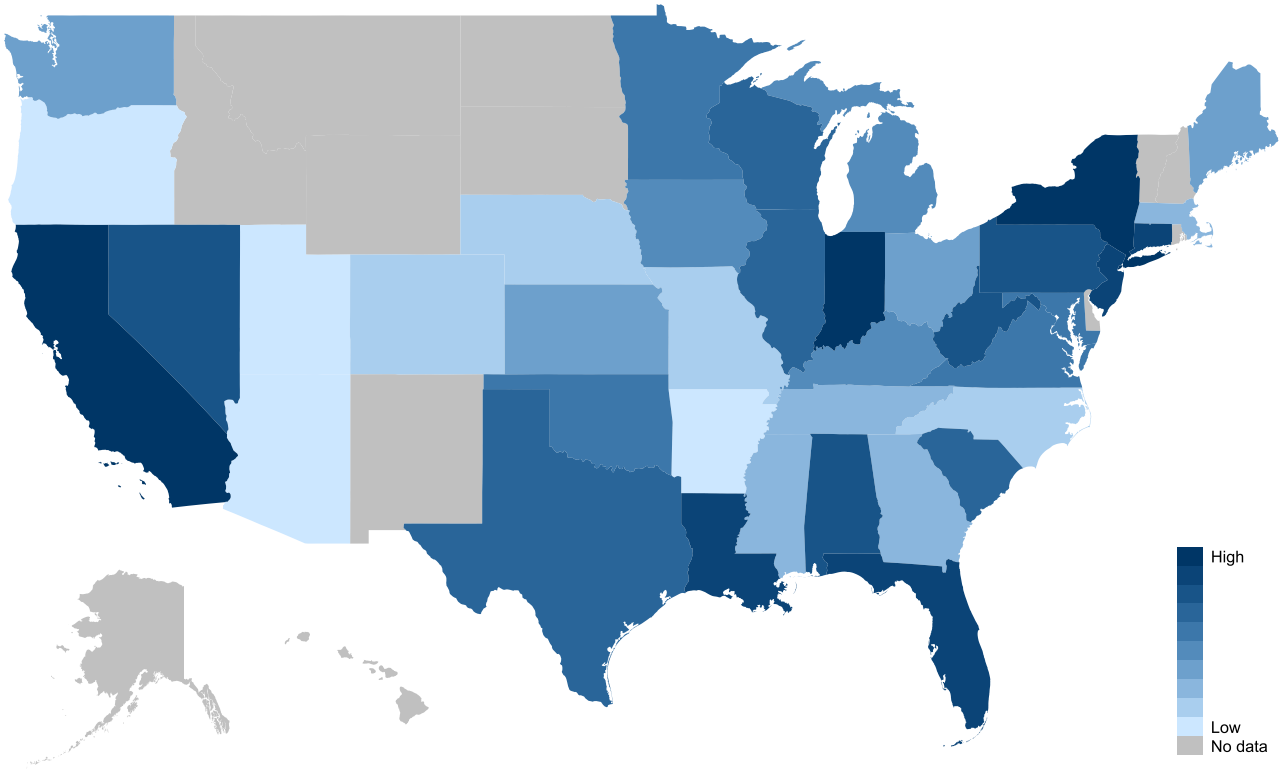

Fig. 3. Overview of (standardized) Machiavellianism scores across states.

objective data enhances the validity of our findings, allowing us to draw more nuanced conclusions about the relationship between narcissism and health. The use of objective data from the CDC helps to counterbalance the potential biases inherent in self-reported data, ensuring that our analysis provides a reliable and accurate picture of the health implications associated with narcissism.

Health outcomes included depression (average depression by state 2018–2020; BRFSS), obesity (2021 BRFSS), rates of sleeping less than 7

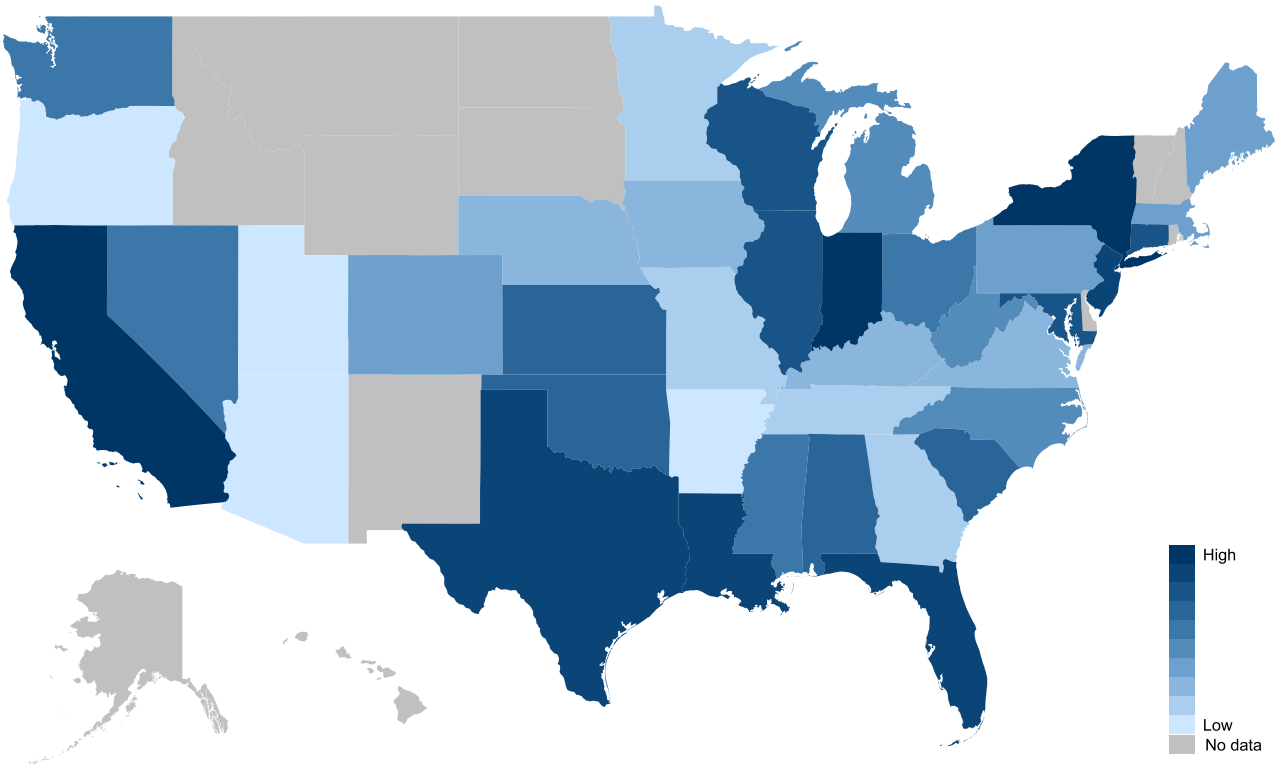

Fig. 4. Overview of (standardized) psychopathy scores across states.

h per night per state from the PLACES dataset (https://chronicdata.cdc.gov/500-Cities-Places/PLACES-Local-Data-for-Better-Health-County-Data-20/swc5-untb) published by the Center for Disease Control and Prevention (2022), and demand for plastic surgeons (i.e., the number of plastic surgeons per 100,000 people) per state from Blau et al. (2020).

Health diseases data includes the percentage of various diseases per state, including cancer (PLACES, 2022), diabetes (PLACES, 2022), heart failure death rate (per 100,000 people; CDC), hypertension death rate (per 100,000 people; CDC), and stroke death rate (per 100,000 people; CDC).

Health and preventive behaviors included data on a variety of health-related behaviors per state, including binge drinking, frequency of colonoscopies, dental check-ups, and medical check-ups (all PLACES, 2022).

2.4. Statistical analyses

In contrast to the self-report individual-level dark triad trait measures, our health outcomes were at the state level of analysis, derived from various archival sources. The state sample size for all our statistical analyses was 38 due to our focus on state-level relationships.[1] We ran several separate regression models for each dependent variable, to assess the association between state-level dark triad traits and selected dependent variables. Originally (see Table 1), some of the variables were reported in percentages, and others in rates (e.g., heart-failure death rates per 100,000 population). To facilitate ease of comparison between outcomes in our analysis, we transformed all variables into percentages.

Second, we utilized spatial autoregressive (SAR) models to delve deeper into the relationship between state-level dark triad traits and their corresponding health outcomes. The choice of SAR models was predicated on the understanding that psychological attributes, such as the dark triad traits, in one state may not exist in isolation but could be influenced by or have an influence on neighboring states. Traditional regression (incl. multilevel) models do not fully capture these spatial dynamics, as they typically assume that observations from different states are independent of one another. Such an assumption can lead to oversimplified conclusions, potentially overlooking the intricate web of spatial interdependencies.

The essence of SAR models lies in their ability to integrate spatial weights matrices, thereby accounting for relationships between different states based on their geographical proximity and shared boundaries. This becomes particularly relevant in our context, where, for example, socio-cultural exchanges, migration patterns, or shared policy initiatives might create a diffusion of dark triad traits across neighboring states. By using SAR models, we are better positioned to identify if, and to what extent, the dark triad traits in one state influence the health outcomes of its neighbors.

For instance, consider a scenario where a state with high levels of dark triad traits shares a border with a state demonstrating poor health outcomes. A traditional model might treat these as independent observations, missing potential spill-over effects or shared socio-cultural influences. However, SAR models allow the modeling of these inter-state influences explicitly, offering a more nuanced insight into the role of dark triad traits in shaping health landscapes across states. This allows us to ensure that our findings are not only accurate but also reflective of the complex interplay between psychological traits and health outcomes across geographical regions. Data were analyzed using Stata 17.0 (Stata, 2021).

3. Results

Correlations at the state level of analysis are shown in Table 2, and

[1] Analyses were conducted including all available state-level data, as well as all states excluding the two states with the highest dark triad trait scores (i.e., California and Indiana). Reported results remained unchanged.

Table 2
Pairwise correlations.

	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1)	S-Narcissism	(0.79)																	
(2)	S-Machiavellianism	0.64***	(0.83)																
(3)	S- Psychopathy	0.74***	0.90***	(0.77)															
(4)	Public Health	−0.01	0.19	0.08															
(5)	Poverty	0.04	0.10	0.09	−0.30														
(6)	Income	0.19	0.12	0.06	0.53***	−0.75***													
(7)	Obesity	−0.23	−0.08	−0.07	−0.36*	0.65***	−0.81***												
(8)	Depression	−0.41**	−0.14	−0.24	0.27	−0.11	−0.08	0.20											
(9)	Sleep (<7h)	0.14**	0.15	0.09	−0.28	0.77***	−0.56***	0.66***	−0.08										
(10)	Surgery Demand	0.41**	0.22	0.14	0.22	−0.34*	0.62***	−0.61***	−0.30	−0.16									
(11)	Cancer	−0.36*	−0.07	−0.17	0.18	−0.41**	0.19	0.04	0.48*	−0.22	−0.19								
(12)	Heart Failure Deaths	−0.45*	−0.19	−0.13	−0.18	0.31	−0.59***	0.58***	0.41**	0.06	−0.71***	0.21							
(13)	Hypertension Deaths	−0.16	0.03	0.06	0.13	0.57***	−0.54***	0.46**	−0.11	0.20	−0.45**	−0.21	0.48***						
(14)	Colonoscopies	−0.18	−0.04	−0.20	0.22	−0.19	0.40**	−0.17	0.41**	−0.01	0.18	0.48***	−0.10	−0.44***					
(15)	Diabetes	0.06	−0.03	0.01	−0.29	0.86***	−0.75***	0.71***	−0.11	0.81***	−0.31	−0.51***	0.33	0.51***	−0.28				
(16)	Stroke Deaths	0.13	−0.02	0.05	−0.32	0.66***	−0.67***	0.65***	−0.06	0.61***	−0.34*	−0.26	0.46***	0.41**	−0.19	0.81***			
(17)	Binge Drinking	−0.07	0.12	0.08	−0.15	−0.39*	0.26	−0.24	−0.19	−0.49***	−0.04	0.14	−0.13	−0.19	−0.09	−0.49**	−0.40*		
(19)	Medical CU	−0.09	0.05	−0.04	−0.02	0.48***	−0.25	0.53***	0.22	0.60***	−0.14	0.19	0.19	0.10	0.46***	0.39*	0.29	−0.35*	
(20)	Dental CU	−0.03	0.08	0.04	0.31	−0.80***	0.73***	−0.62***	0.19	−0.64***	0.30	0.45**	−0.25	−0.56***	0.44**	−0.84***	−0.64***	0.40*	−0.17

Note: S = State-level; Public health funding per capita by state 2021; Poverty: poverty rate by state (2021); Income: per capita income by state (2021); Depression (state average of 2014–2018); Surgical Density (Surgeons per 10/1000 people); Heart Failure Death (rate per 100,000; 2018–2020); Hypertension Death (rate per 100,000; 2018–2020); Diabetes (per 100,000; 2020); Stroke Death (rate per 100,000; 2018–2020); Medical CU: medical check-up (per 100,000; 2022); Dental CU: dental check-up (per 100,000; 2022).
* p < 0.05; ** p < 0.01; *** p < 0.001.

results from our spatial autoregressive models using generalized spatial two-stage least-squares estimators (G2SLS).[2] Results are displayed in Tables 3-5. Examination of Table 2 reveals that narcissism was the only state-level dark triad score related to the various health-related dependent variables. However, rather than focusing on these zero-order relationships, we examined the regression results in which the unique contributions of each dark triad factor are shown after controlling for each state's public health funding per capita, poverty rate, and per capita income (in the case of demand for plastic surgeons).

Table 3-5 shows our state-level regression results using the dark triad scores on the health outcome-dependent variables. For almost all of these dependent variables, we used public health funding per capita and poverty rate as control variables in our analyses. The only exception was when assessing the relationship between state narcissism and demand for plastic surgeons. Here, we controlled for per capita income by the state as such procedures are usually elective and come at a high financial cost.

3.1. Health outcomes

We find that state narcissism was associated with lower rates of depression (Table 3: b = −0.03, SE = 0.01, z = −2.06, $p = 0.040$) and obesity (b = −0.14, SE = 0.05, z = −2.90, $p = 0.004$), and a significantly higher percentage of people sleeping less than 7 h per night (b = 0.08, SE = 0.04, z = 2.16, $p = 0.031$). State narcissism was also positively associated with demand for plastic surgeons (b = 0.20, SE = 0.05, z = 4.02, $p < 0.001$), which was also the case for state Machiavellianism (b = 0.11, SE = 0.06, z = 1.97, p = 0.05).

Psychopathy was found to significantly contribute to the prediction of only one health outcome. Namely, state psychopathy was negatively associated with demand for plastic surgeons (b = −0.20, SE = 0.06, z = −3.17, $p = 0.002$). Psychopathy did not contribute to the prediction of any other health outcome variable.

3.2. Health diseases

Table 4 shows our state-level regression results using the dark triad scores to predict disease percentage rates. State narcissism was nega-

Table 3
Regression results for health outcomes.

	Depression b (SE)	Obesity b (SE)	Sleep less than 7 h/night b (SE)	Surgeon Density b (SE)
State Narcissism	−0.03*	−0.14**	0.08*	0.20***
	(0.01)	(0.05)	(0.04)	(0.05)
State Machiavellianism	0.03	−0.05	0.01	0.11*
	(0.02)	(0.07)	(0.05)	(0.06)
State Psychopathy	−0.02	0.09	−0.07	−0.20**
	(0.02)	(0.07)	(0.05)	(0.06)
Public Health Funding 2021	0.00	−0.00*	0.00	−0.00*
	(0.00)	(0.00)	(0.00)	(0.00)
Poverty	−0.00	0.01*	0.01***	0.01**
	(0.00)	(0.00)	(0.00)	(0.00)
Income per capita				(0.00)
Constant	0.07*	0.59***	0.14	−0.64***
	(0.03)	(0.11)	(0.08)	(0.10)
χ^2	27.21***	102.44***	840.94***	351.30***

[2] with the exception of the health outcome depression for which we used a maximum likelihood estimator (as recommended due to a non-significant Moran test result.

Table 4
Regression results for diseases.

	Cancer b (SE)	Diabetes b (SE)	Heart Failure Deaths b (SE)	Hypertension Deaths b (SE)	Stroke Deaths b (SE)
State Narcissism	−0.01	0.02	−0.28***	−0.32*	−0.00
	(0.00)	(0.01)	(0.06)	(0.14)	(0.01)
State Machiavellianism	0.00	−0.01	−0.08	−0.17	0.00
	(0.00)	(0.02)	(0.08)	(0.19)	(0.02)
State Psychopathy	−0.00	−0.01	0.21**	0.32	0.01
	(0.00)	(0.02)	(0.08)	(0.20)	(0.02)
Public Health Funding 2021	−0.00	−0.00	−0.00	0.00**	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Poverty	−0.00*	0.00***	−0.00	0.02**	0.00
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)
Constant	0.07***	0.07*	0.68***	0.66*	0.04
	(0.01)	(0.03)	(0.13)	(0.33)	(0.03)
χ^2	30.49***	279.01***	91.61***	111.29***	623.95***

Table 5
Regression results for health and preventive behaviors.

	Binge Drinking b (SE)	Colonoscopy b (SE)	Dental Check-Up b (SE)	Medical Check-Up b (SE)
State Narcissism	−0.05	−0.00	0.02	0.10
	(0.04)	(0.08)	(0.07)	(0.06)
State Machiavellianism	0.11*	0.10	0.02	−0.11
	(0.05)	(0.12)	(0.10)	(0.09)
State Psychopathy	−0.06	−0.19	−0.03	−0.03
	(0.05)	(0.13)	(0.09)	(0.08)
Public Health Funding 2021	−0.00**	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Poverty	−0.00	−0.00	−0.01*	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.13	0.83***	0.64***	0.75***
	(0.08)	(0.21)	(0.16)	(0.14)
χ^2	130.82***	91.59***	148.06***	42.35***

Note: Standard errors in parentheses; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

tively significantly associated with deaths due to heart failure (b = −0.28, SE = 0.06, z = −4.60, $p < 0.001$) and hypertension-related deaths (b = −0.32, SE = 0.14, z = −2.30, $p = 0.022$).

Psychopathy was found to contribute to the prediction of heart failure deaths even after state-level narcissism scores were accounted for. States with higher psychopathy scores were more likely to have more heart failure deaths (b = 0.21, SE = 0.08, z = 2.63, $p = 0.009$). Psychopathy was not found to significantly contribute to the prediction of any other disease-dependent variables. State Machiavellianism was not associated with any health diseases.

3.3. Health behaviors

Table 5 shows our regression results using the state-level dark triad scores to predict health behaviors while accounting for public health funding and poverty rates. As seen in this table, we found that the dark triad factors only predicted one of the examined health behaviors, namely binge drinking. Specifically, state Machiavellianism was positively associated with binge drinking (b = 0.11, SE = 0.05, z = 2.25, $p = 0.024$). Neither state narcissism nor psychopathy were found to predict any of the examined health behavior-dependent variables.

3.4. Robustness check

Because health outcomes can be driven by demographic factors, such as ethnicity, age, and gender, we conducted two separate robustness checks. First, we also applied a stratified sampling approach. We utilized a stratified sampling method, adjusting state-level dark triad trait averages based on each state's ethnic composition. This involved recalculating state-level scores by multiplying the proportion of each ethnicity in a state with its respective original dark triad trait mean. Subsequently, we compared these newly generated state scores, which account for ethnic distribution, with the original state scores, which presumably did not account for ethnicity. The correlation between the two sets of scores was almost perfect for all three dark triad traits ($r > 0.99$). The near-perfect correlation indicates that, even after accounting for the distribution of ethnicity in each state, the dark triad trait scores remain consistent.

Second, to account for age and gender, we calculated state-level averages for both age and gender based on our sample and incorporated these variables into our regression models. Among the various relationships we were studying, all outlined significant associations remained unchanged. However, controlling for age and gender on a state-level, we found that state narcissism was significantly associated with several more outcomes, including binge drinking (b = −0.08, z = −2.01), cancer (b = −0.01, z = −1.97) and medical check-ups (b = 0.16, z = 4.42). State Machiavellianism also was associated with more health outcomes, including colonoscopies (b = 0.24, z = 2.56), and depression (b = 0.04, z = 2.20). Psychopathy was associated with colonoscopies (b = −0.23, z = −2.53) and deaths due to hypertension (b = 0.42, z = 2.07).

While these results certainly seem interesting and warrant further investigation, it is important to remember the model limitations due to the inclusion of two more predictors in these models and the limited number of states examined. Overall, however, we note that all previously found relationships between variables remained consistent in both significance and direction of effect even after accounting for age and gender.

These additional analyses suggest that the dark triad trait scores are not heavily biased or influenced by the ethnic distribution within states, age, or gender. This strengthens our confidence that our original findings were robust and not merely a consequence of demographic discrepancies.

Finally, it could be argued that the effects we find by using the overall narcissism score from the SD3 are likely driven by grandiose narcissism, not other forms of narcissism (e.g., vulnerable narcissism). In a subsequent analysis, we reran our analyses with grandiose narcissism using only those items that reflect grandiose narcissism. Out of the nine SD3 narcissism items, five represented grandiose narcissism (e.g., "Many group activities tend to be dull without me" and "I know that I am special because everyone keeps telling me so"; sub-scale α = 0.73). The correlation between grandiose narcissism and the overall narcissism factor was near perfect (r = 0.96). Results were largely unchanged in that state-level grandiose narcissism was associated with obesity (b = −0.17, z = −3.18), surgeon density (b = 0.15, z = 2.65), deaths due to heart failure (b = −0.20, z = −2.69) and hypertension (b = −0.37, z = −2.32). However, we found no significant association between state-

level grandiose narcissism and depression (b = −0.02, z = −0.93) and sleep (b = 0.05, z = 1.69), unlike results for overall narcissism. Despite the lack of significance for these last two correlations, all correlations with the 5-item sub-scale were in the same direction as results when we used the overall 9-item SD3 narcissism score.

4. Discussion

The present study investigated the association between the dark triad traits and various health outcomes, diseases, and behaviors at the state level of analysis within the United States. Our results reveal a complex pattern of associations, with narcissism being the most consistently predictive dark triad trait.

Our findings indicated that state-level narcissism was negatively associated with obesity and depression rates but positively related to the supply of plastic surgeons in a state and the percentage of people sleeping less than seven hours per night. These findings on the state-level are consistent with the prior research on the individual level in that narcissists are more preoccupied with their physical and public appearance than non-narcissists (Foster et al., 2003). Interestingly, our results also show that states with a larger narcissistic population had a greater percentage of people sleeping less than seven hours per night. This finding might be due to the tendency of narcissists to engage in self-enhancement (Jonason et al., 2015) and socialization activities (Foster et al., 2006). This increased socialization reported in the individual-level literature might explain why the average rate of sleep is less than seven hours per night in more narcissistic states than in less narcissistic states.

Our findings seem to be largely driven by grandiose narcissism, as captured by the Short Dark Triad scale. We initially selected the SD3 due to its established reputation in accurately measuring dark triad traits, coupled with its brevity compared to separate scales for each trait. Isolating the grandiose narcissism component from the SD3 and reanalyzing our data, as opposed to the broader narcissism construct typically assessed by the SD3, we discovered that while the association with obesity, surgeon density, heart failure deaths, and hypertension remained consistent with our initial findings, the relationship between state-level grandiose narcissism and depression or sleep did not mirror the results seen with overall narcissism. This nuanced understanding emphasizes the complexity of narcissistic traits and their differential impact on health and societal outcomes, and warrants further investigation in future research endeavors.

In terms of health diseases, state narcissism was negatively associated with deaths due to heart failure and hypertension. Perhaps this state-level relationship was due to narcissistic individuals' heightened focus on maintaining their health and appearance, as well as their potential engagement in regular exercise and healthy eating habits (Vazire et al., 2008).

Surprisingly, state-level narcissism was not associated with the frequency of colonoscopies, medical check-ups, or dental check-ups. One explanation could be that narcissistic individuals' focus on and preoccupation with physical appearance, do not necessarily translate into more frequent check-ups. Hence, it seems that the significant relationships between narcissism and health outcomes are limited to observable factors of health.

In contrast to the results for narcissism, differences between states in terms of Machiavellianism and psychopathy were, for the most part, not associated with health outcomes. For example, state Machiavellianism was positively associated with a higher demand for plastic surgery, whereas state psychopathy was associated with an aversion to plastic surgery. State-level Machiavellianism was also associated with binge drinking. State-level psychopathy on the other hand was positively associated with deaths due to heart failure. Apart from these associations, however, neither Machiavellianism nor psychopathy had broad health implications.

5. Limitations

Many of our findings supported prior individual-level research. This is noteworthy because the prior studies relied on self-report health outcomes whereas in the present study, we used archival resources to gather our dependent variable. And while the number of state-level observations on which our findings are based is limited, there are multiple benefits to the selected archival approach presented in this paper. Firstly, our analysis covers 38 out of 50 states, which constitutes 76 % of all possible states. This extensive coverage ensures that our findings are representative of a significant portion of the United States. By encompassing such a broad range of states, the study provides a comprehensive and generalizable understanding of the trends and relationships at play, which is crucial for a topic as complex and varied as the interplay between narcissism and health.

Secondly, by focusing on state-level data, we effectively mitigate risks associated with common method variance or same-source bias. This is a notable advantage over studies that rely solely on individual-level data. In individual-level analyses, both predictors and outcomes are often reported by the same subjects, leading to potential biases. Our state-level approach, on the other hand, reduces this likelihood, thereby enhancing the validity and reliability of our results.

Thirdly, and related to the previous point, our study navigates around the constraints posed by HIPAA regulations regarding access to individual medical records. HIPAA's stringent requirements for individual consent for the use of medical records often lead to a biased sample in individual-level studies, as those who consent may differ systematically from those who do not. By focusing on aggregated state-level data, our study avoids these challenges, allowing for a more unbiased and representative analysis.

In addition, while the consistent patterns observed for narcissism suggest that this trait may have significant implications for individuals' health and well-being, the overall lack of significant associations between Machiavellianism and psychopathy in many cases highlights the need for further research to understand the complex interplay between dark triad traits and health. Future studies could investigate potential moderating variables, such as socioeconomic status or cultural factors, to better understand the nuances of these relationships.

Finally, our study extends beyond the individual level of analysis by considering broader governmental policies and regulations. This perspective is vital for understanding the relationship between narcissism and health, as it incorporates the influence of larger systemic factors. By analyzing state-level personality traits, we can identify broader social and cultural trends that might impact health outcomes. This approach suggests a more systemic and widespread influence, underscoring the importance of state-level analysis in uncovering significant trends that might be overlooked in individual-based studies. In addition, our state-level findings provide evidence that governmental bodies cannot easily discount as purely individual-level phenomena. We believe that our study complements individual-level research and adds a valuable dimension to the discourse on public health and personality psychology.

6. Conclusion

In this article, we sought to provide a balanced analysis of the potential benefits of narcissism on health outcomes, with a focus on the inverse association between narcissism and several health-related outcomes. By examining the adaptive components of narcissism and their impact on self-care, this article aimed to challenge traditional perspectives on narcissism and expand the understanding of its role in health-related behaviors. Furthermore, the exploration of state-level narcissism and its potential correlations with health outcomes provides valuable insights for healthcare providers, policymakers, and researchers interested in the complex interplay between personality traits and health.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT 4 in order to improve the language and writing of a draft of this paper. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

CRediT authorship contribution statement

Dritjon Gruda: Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Writing – original draft. **Paul Hanges:** Formal analysis, Funding acquisition, Methodology, Writing – review & editing, Data curation. **Jim McCleskey:** Data curation, Funding acquisition, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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