Omaha Public Power District

OPPD BOARD OF DIRECTORS

BOARD MEETING MINUTES

December 18, 2025

The regular meeting of the Board of Directors of the Omaha Public Power District ("OPPD" or "District") was held on December 18, 2025, at 5:00 p.m. at the Omaha Douglas Civic Center, 1819 Farnam Street, 2nd Floor Legislative Chamber, Omaha, Nebraska and via WebEx audio and video conference.

Joining in person were Directors A. E. Bogner, M. J. Cavanaugh, M. R. Core, S. E. Howard, J. L. Hudson, C. C. Moody, M. G. Spurgeon and E. H. Williams. Also present were L. J. Fernandez, President and Chief Executive Officer, and Messrs. S. Bruckner and T. Thalken, of the Fraser Stryker law firm, General Counsel for the District, E. H. Lane, Sr. Board Operations Specialist, and other members of the OPPD Board meeting logistics support staff. Chair M. R. Core presided, and E. H. Lane recorded the minutes. Members of the executive leadership team joining in person included S. M. Focht, C.V. Fleener, T. D. McAreavey, T. R. Via and B. R. Underwood.

Board Agenda Item 1: Chair Opening Statement

Chair Core gave a brief opening statement, including reminders for using the WebEx audio and video conferencing platform.

Board Agenda Item 2: Safety Briefing

J. Clark, Manager, Protective Services, provided safety reminders.

Board Agenda Item 3: Guidelines for Participation

Chair Core then presented the guidelines for the conduct of the meeting and instructions on the public comment process in the room and using WebEx audio and video conferencing features.

Board Agenda Item 4: Roll Call

Ms. Lane took roll call of the Board. All members were present in person.

Board Agenda Item 5: Announcement regarding public notice of meeting

Ms. Lane read the following:

> *"Notice of the time and place of this meeting was publicized by notifying the area news media; by publicizing same in the Omaha World Herald and Nebraska Press Association, OPPD Outlets newsletter, oppd.com and social media; by displaying such notice on the first level of the OPPD administrative offices; and by e-mailing such notice to each of the District's Directors on December 12, 2025.*

A copy of the proposed agenda for this meeting has been maintained, on a current basis, and is readily available for public inspection in the office of the District's Corporate Secretary.

Additionally, a copy of the Open Meetings Act is available for inspection on oppd.com."

Board Consent Action Items:

6. Approval of the October 2025 Financial Report, November 2025 Meeting Minutes, and December 18, 2025 Agenda
7. SD-8: Employee Relations Monitoring Report – Resolution No. 6735
8. SD-11: Economic Development Monitoring Report – Resolution No. 6736
9. SD-12: Security and Information Management Monitoring Report – Resolution No. 6737
10. RFP 6225 - Nebraska City Station Unit 1 Flue Gas Expansion Joint Material & Labor Contract Award – Resolution No. 6738
11. Nebraska City Station Unit 2 Distributed Control System Upgrade - Engineer's Certification – Request to Negotiate – Resolution No. 6739
12. North Omaha Station Unit 4 (NO4) Low Pressure Turbine Refurbishment - Engineer's Certification – Request to Negotiate – Resolution No. 6740
13. Nebraska City Station Unit 2 Turbine and Generator Repair Labor and Technical Services - Engineer's Certification – Request to Negotiate – Resolution No. 6741
14. Declaration of Anticipated 2026 Capital Expenditures Reimbursement – Resolution No. 6742

It was moved and seconded that the Board approve the consent action items.

Chair Core asked for public comment in person and on WebEx. There were no comments.

Thereafter, the vote was recorded as follows: Bogner – Yes; Cavanaugh – Yes; Core – Yes; Howard – Yes; Hudson – Yes; Moody – Yes; Spurgeon – Yes; Williams – Yes. The motion carried (8-0).

Board Discussion Action Items

15. 2026 Final Corporate Operating Plan – Resolution No. 6743

Director Moody moved to approve the discussion action item, and it was seconded by Director Spurgeon. Director Moody presented the resolution and noted it was discussed in the All Committees meeting on Tuesday. Chair Core asked for Board member questions or comments. Director Spurgeon offered comments in support of the resolution.

Chair Core then asked for public comments in the room. There were three.

David Begley, 4611 S. 96th St, provided comments on renewables and rising rate pressure, and presented materials which are attached to the minutes.

LaVerne Treahn, Omaha, NE, provided comments on the proposed rate changes.

Anthony Rogers Wright, 3010 Lincoln Blvd, provided comments on renewable energy as a low cost alternative to raising rates.

Chair Core asked for comments from the public on WebEx. There were no comments.

Thereafter, the vote was recorded as follows: Bogner – No; Cavanaugh – Yes; Core – Yes; Howard – No; Hudson – Yes; Moody – Yes; Spurgeon – Yes; Williams – Yes. The motion carried (6-2).

16. Modification of Resolution No. 6518 Regarding North Omaha Station Operations – Resolution No. 6744

Director Bogner moved to approve the discussion action item, and it was seconded by Director Cavanaugh. CEO Fernandez provided comments on the concerns of the community and the future of the utility. Director Moody and Director Williams asked questions regarding the timeline of the conversion of North Omaha Station. CEO Fernandez and T. R. Via, COO and Vice-President Utility Operations, provided responses to the questions.

Chair Core then asked for public comments in the room. There were 34 comments.

David Begley, 4611 S. 96th St, provided comments on North Omaha Station and OPPD's net zero goal, and presented materials which are attached to the minutes.

Anthony Rogers Wright, 3010 Lincoln Blvd, Omaha, provided comments

Jennifer Glazer, 105 S. 93rd Ave, Omaha, provided comments on the North Omaha Station and urged the board to keep their goal to refuel/retire the coal units.

Kay Carne, 143 White Deer Ln, with Citizens Climate Action, provided comments in support of the North Omaha community.

John Pollack, 1412 N. 35th Street, Omaha, provided comments on the North Omaha health study and the proposed resolution.

Terrell McKinney, 5319 N. 30th St, representing BOLD Alliance, provided comments on the lack of transparency with the North Omaha community and refueling/retiring North Omaha Station.

Melia Gotch, 5719 S. 98th Plaza, provided comments on the Walter Scott Jr. power station in Council Bluffs and the health care costs of burning coal in a community.

Hayden Ripik, 1805 North Main St., provided comments on the increase in generation due to data centers and burning coal's effect on the environment.

Connor Nichols, with the Nebraska Conservation of Voters, provided comments on the timeline for the conversion of North Omaha Station.

Mele Mason, 9632 N. 34th St, provided comments on the North Omaha health study.

Mark Salerno, President, IBEW Local 1483, provided comments in support of the extension of North Omaha Station to provide reliable, affordable power to all customer owners.

Brad Erickson, representing IBEW 763, provided comments in support of lower rates and keeping skilled jobs by delaying the transition of North Omaha Station.

Jane O'Connor, 5412 Charles St, provided comments on the health and economic inequality of North Omaha.

Jonathon Paetz, 17226 Williams Cir., Omaha, provided comments on the North Omaha Station resolution as a path to refuel or retire the coal units.

Charlene Potter, 4321 Larimore Ave., provided comments on the effects of coal emissions on nature and animals.

Ashlei Spivey, 12037 N. 40th, State Senator – District 13, provided comments of support for and appreciation of the North Omaha community and expressed disappointment in the proposed resolution and extension of burning coal in North Omaha.

Betty Tamasi, 7389 North 89th St., provided comments in support of renewable energy.

Dan DiLeo, 5817 S.176th St, Omaha, provided comments on the lack of transparency from the Board and management, and the EPRI health study.

Steven Dickerson, 5214 Cass St, representing the Students for Sustainability, provided comments on OPPD's lack of transparency regarding the North Omaha Station transition.

Thomas Neneman, 7212 N. 76th St., provided comments on North Omaha coal generation and cost of health insurance and services.

Precious McKesson, 6716 NE Ave, provided comments on the lack of communication with the North Omaha community, the Attorney General's lawsuit and disappointment in the resolution.

Carol Irey, 3719 Ohio St, provided comments on a health fund for North Omaha children and cleaner burning coal.

Mariah Johnson, 3030 N. 60th St., provided comments on the focus on economic benefits of burning coal and not the health of the community.

Crystal Craig, 3521 Haskell St., provided comments on wind and solar energy.

Liz Veazey, 912 N. 49th St., provided comments on environmental justice, accountability and the North Omaha health study.

Jordan Anderson, 6733 S. 191st Ave., representing the Nebraska Sierra Club executive committee, provided comments on decarbonization goals, sustainable and renewable energy, and the political climate.

Jane Kleeb, Hastings, NE, representing BOLD Nebraska, provided comments on the benefits of public power, environmental justice, and community solar panels.

Nancy Gaarder, 2720 Iowa St, provided comments on rebuilding trust with the North Omaha community.

Ethan Wilkins, 3920 Dewey Ave, provided comments on the EPRI health study, investing in renewable energy and data centers energy usage.

Luis Jiminez, 2709 Dewey Ave, provided comments on the need for advocating to the city and county to support renewable energy.

LaVerne Treahn, Omaha, NE, provided comments on shutting down coal plants and converting to natural gas.

Jesse Fischer, 6665 Ohio St, provided comments on data centers using too much power and the lack of transparency of data center load.

Paul Fileman, Yutan, NE, provided comments on the expert health panel presentation at Creighton versus the EPRI health study.

Roger Carroll, 417 N. 38th Ave, provided comments the Omaha World Herald article regarding the North Omaha health study, the Creighton expert panel, and battery storage plans.

Chair Core asked for comments from the public on WebEx. There were five.

David Corbin, 1002 N. 49th St, representing the Nebraska Sierra Club, provided comments on energy innovations.

Ken Winston, Lincoln, NE, representing the Missouri Valley Sierra Club, provided comments on OPPD's timing to retire North Omaha Station and expressed support for the North Omaha community.

Cheryl Weston, 1822 Emmett St, provided comments on OPPD's mission statement and lack of accountability to the North Omaha community.

Chelsea, provided comm ents on climate change, data centers and the accountability of OPPD management.

LaVonya Goodwin, Omaha Councilmember, District 2, provided comments on the lack of accountability and responsibility of OPPD to the North Omaha community.

Chair Core asked for comments from the Board. Director Bogner, Director Cavanaugh, Director Moody and Director Williams all provided comments on the resolution.

Thereafter, the vote was recorded as follows: Bogner – Yes; Cavanaugh – Yes; Core – Yes; Howard – No; Hudson – Yes; Moody – Yes; Spurgeon – Yes; Williams – No. The motion carried (6-2).

Board Agenda Item 11: President's Report

Chair Core noted the President's Report is not being presented this evening due to the duration of the meeting, but the report can be found on OPPD.com, under the Board meeting and schedule section.

Board Agenda Item 12: Opportunity for comment on other items of District Business

Chair Core asked for comments from the public in the room on other items of District business. There were four comments.

Nancy Gaarder, 2720 Iowa St, provided comments of thanks to Director Williams and the Board and management for their hard work this year.

John Pollack, 1412 N. 35th Street, Omaha, provided a weather update.

Dan DiLeo, 5817 S.176th St, Omaha, provided comments on the lack of transparency from the Board and management, and the EPRI health study.

Anthony Rogers Wright, provided comments on SPP and large load customers additional burden to the electric grid.

Chair Core asked for comments from the public online on other items of District business. There were no comments.

There being no further business, the meeting adjourned at 8:25 p.m.

Signed by:
S. M. Focht
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S. M. Focht
Vice President – Corporate Strategy & Governance and Assistant Secretary

DocuSigned by:
Erin H. Lane
965CE2363A0A42C...

E. H. Lane
Sr. Board Operations Specialist

D. Bogey

Tollfromcoal.org

	NOS 646 MW	**NCS** 1330 MW
Deaths	**17**	**29**
Hosp. admission	2	6
Asthma ER	3	6
Heart attack	7	12
Acute bronchitis	189	18
Eight mile population	551550	13174
Deaths	0.0003	0.0022

Conclusion: Nebraska City Station is a much larger health risk than North Omaha Station. Ergo, better to close NCS if human life is equally valued between Otoe County and Douglas County.

Tollfromcoal.org is a project of the Clean Air Task Force

Founded in 1996; 135 employees

O P P D P R O J E CT

DECEMBER 18, 2025

OMAHA SAFETY-NET RESILIENCE

MONITORING REPORT

Paul J. Nelson, MS, MD

Population Health

DESIGN EPISTEMOLOGY

www.nationalhealthusa.net/prospectus/design-epistemo-logy/

REFERENCE TODAY

National Health Spending / MEPS Statistical Brief #528 / 2017

Implementation Plan: User Accounts Due, Weekly, Population Selected, Accounts-Receivable Total

As a regularly reported, community stress assessment for Omaha's Population Health

Phase One - Design Trial period (3-6 months, as adjusted)

1. **House**-holds only – Accounts Receivable ranked Highest to lowest
2. Remove 25% of lowest And 25% of highest for initial test (subsequently adjust based on stability of weekly reassessment trial
3. Total Charges 05% accounts divided by Number of accounts determined weekly
4. No public reporting

Phase Two - Design Verification (1-3 years)

1. Reporting trend analysis has evidence of usability as in low level correlation with local weather, employment rates, mid-west social mobility, and community violence (violence related mortality)
2. Our community has developed a process to correlate SAFETY-NET RESILIENCE across social-ecological domains, especially our County Health Department, for which OPPD can participate to meaningfully adjust its design or identify another resilience monitoring tool.

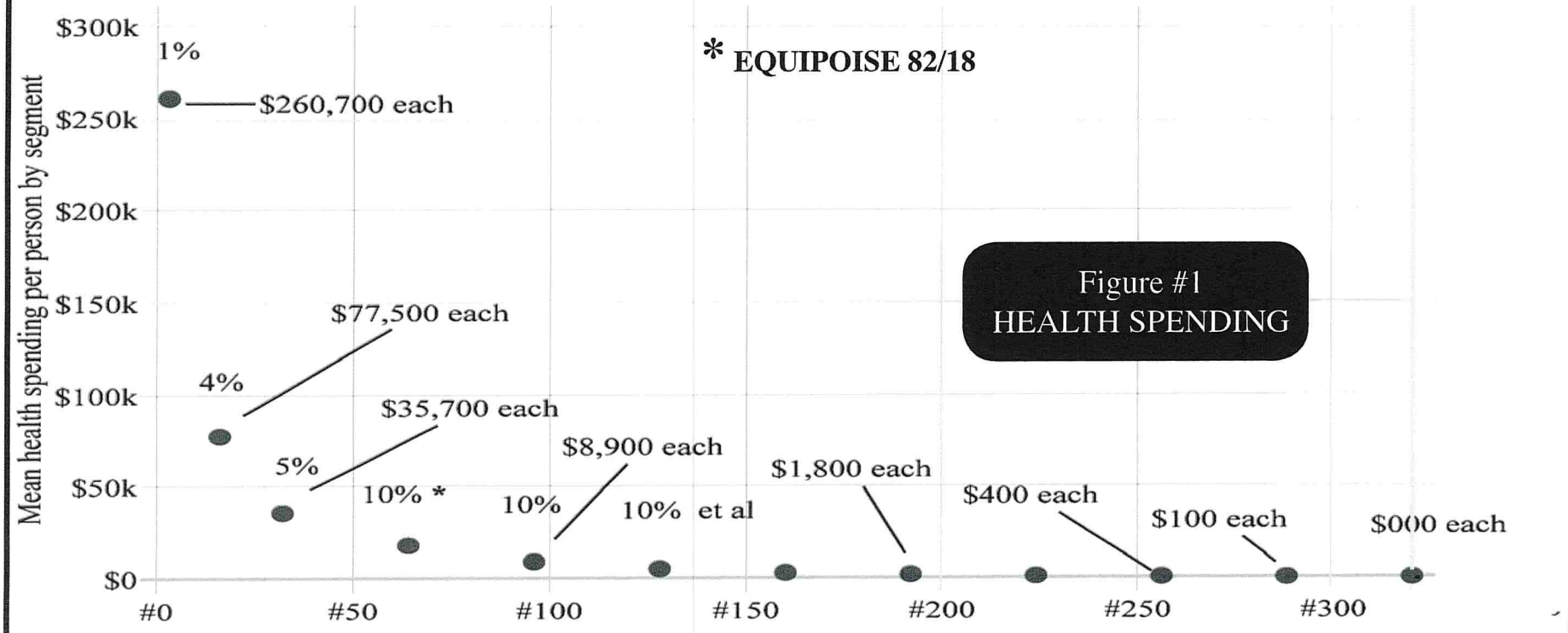
Phase Three – Sustainability

1. A permanent commitment as a basis to inform community-wide projects to improve the Prosocial Norms within every Omaha neighborhood (see DESIGN EPISTEMOLOGY).

NATIONAL HEALTH SPENDING 2017

$3.57 Trillion

The Power Law Attributes Of Its Distribution



320 million persons

each person's estimated total health spending in 2017: rank-ordered from highest to lowest and segmented by the mean spending level of 12 successive percentile groups of persons

CITIZEN NATIONAL HEALTH SPENDING - 2017 - $3.57 TRILLION

320 MILLION CIVILIAN NON-INSTITUTIONALIZED CITIZENS

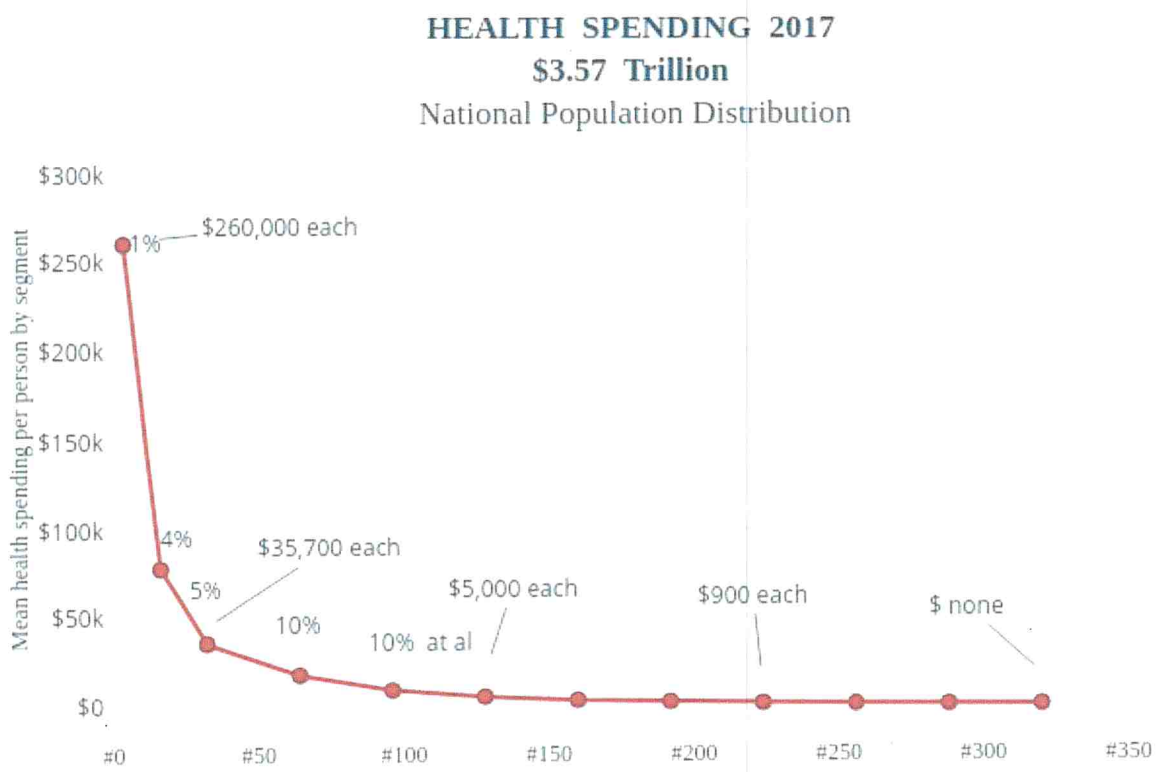
BY - POPULATION SEGMENTS - HIGEST TO LOWEST

SEGMENT	CITIZENS	HEALTH SPENDING (HS)	PORTION TOTAL HS By Segment	AVERAGE CITIZEN HS PER SEGMENT
01%	03 million	21.9% of HS	$782 billion	$260,700 each
04%	13 million	28.2% of HS	$1,007 billion	$77,500 each
05%	16 million	16.0% of HS	$571 billion	$35,700 each
10%	32 million	15.9% of HS	$568 billion	$17,800 each
10%	32 million	08.0% of HS	$285 billion	$8,900 each
10%	32 million	04.5% of HS	$160 billion	$5,000 each
10%	32 million	02.6% of HS	$92 billion	$2,800 each
10%	32 million	01.6% of HS	$57 billion	$1,800 each
10%	32 million	00.8% of HS	$29 billion	$900 each
10%	32 million	00.4% of HS	$14 billion	$440 each
10%	32 million	00.1% of HS	$4 billion	$130 each
10%	32 million	00.0% of HS	$0 billion	$0 each
TOTAL	320 million	100.0% of HS	$3,570 billion	$11,156 each (average for all citizens)

Population estimate by Census Bureau for 7-1-2017 320,073,990

Health Spending Estimates take from Table 1 from MEPS Statistical Brief #528

Total Health Spending for 2017 reported in Health Spending analysis report released by Altarum Institute in March 2018



plotly | Chart Studio

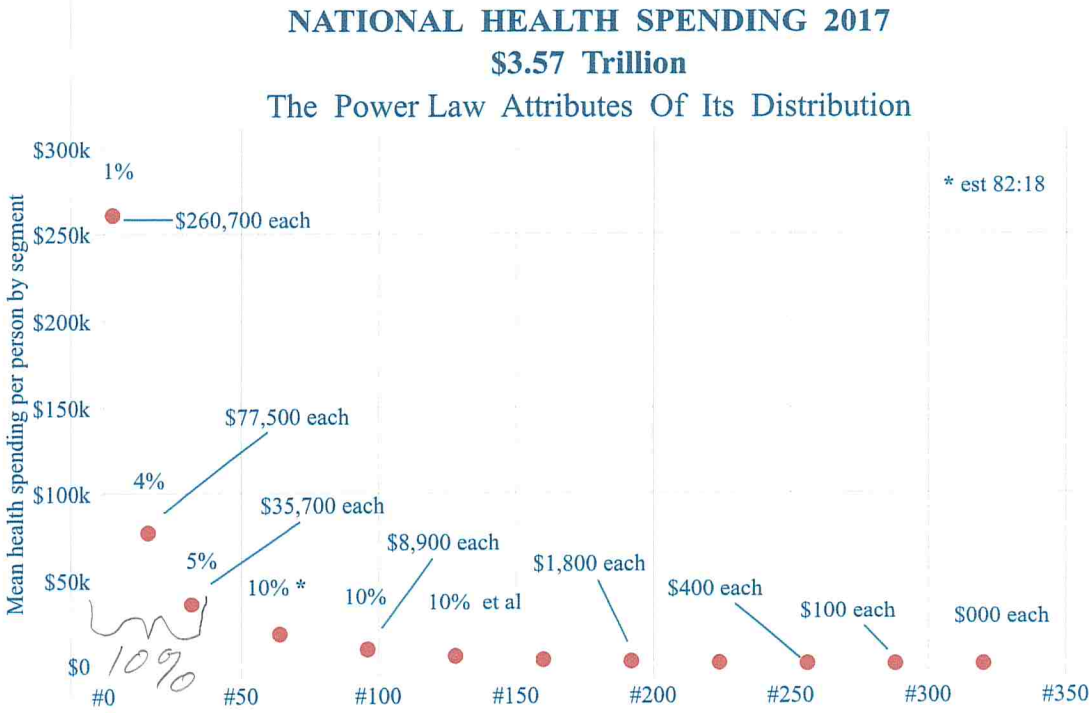
+ Create nelsonp60

@nelsonp60 5 days ago

Plot Data Python & R

Forking History

Public



Comment

NATIONAL HEALTH SPENDING 2017

$3.57 Trillion

The Power Law Attributes Of Its Distribution

*** EQUIPOISE 82/18**

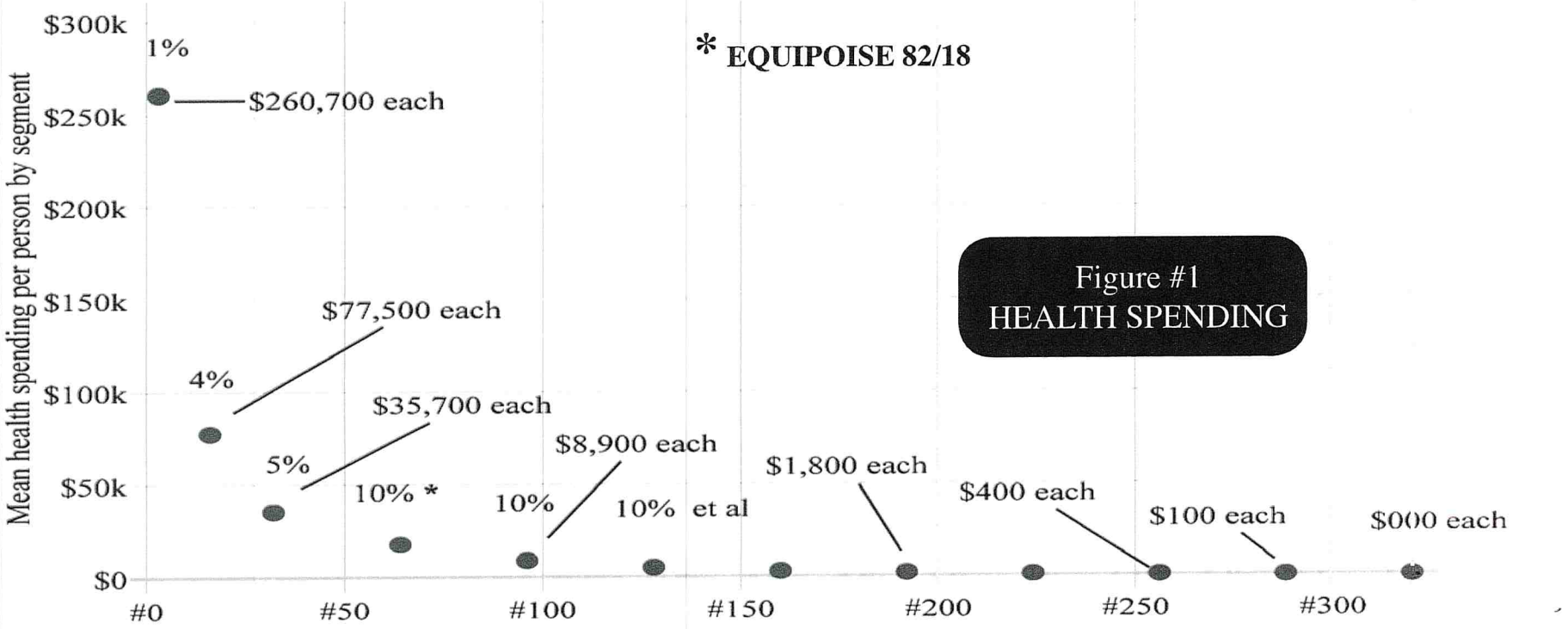


Figure #1
HEALTH SPENDING

320 million persons

each person's estimated total health spending in 2017: rank-ordered from highest to lowest and segmented by the mean spending level of 12 successive percentile groups of persons

February 2020

Concentration of Healthcare Expenditures and Selected Characteristics of High Spenders, U.S. Civilian Noninstitutionalized Population, 2017

Emily M. Mitchell, PhD

Highlights

- In 2017, the top 1 percent of persons ranked by their health care expenditures accounted for about 22 percent of total health care expenditures, while the bottom 50 percent accounted for only about 3 percent.
- Persons ages 65 and older and whites were disproportionately represented in the top spending tiers.
- Inpatient hospital care accounted for 40 percent of spending for persons in the top 5 percent of the spending distribution.
- About three quarters of aggregate expenses for persons in the top 5 percent of spenders were paid for by private insurance and Medicare.

Introduction

In 2017, spending on health care accounted for 17.9 percent of the United States GDP,[1] yet the majority of this spending was concentrated in a relatively small percentage of the population. In fact, about 15 percent of the U.S. civilian noninstitutionalized population had no health care expenditures in 2017, and only 5 percent of the population accounted for over half of health care spending. This includes all sources of payments for medical care, including private insurance payments, Medicare, Medicaid, out-of-pocket spending, and other sources.

In this Statistical Brief, data from the Agency for Healthcare Research and Quality's (AHRQ) Medical Expenditure Panel Survey Household Component (MEPS-HC) are used to describe the overall concentration of health care expenses across the U.S.

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[1] Sisko, A, et al. National Health Expenditure Projections, 2018–27: Economic and Demographic Trends Drive Spending and Enrollment Growth. *Health Affairs*, March 2019.

civilian noninstitutionalized population in 2017. In addition, different spending tiers are compared on selected dimensions including age, race/ethnicity, type of medical service, and aggregate spending distributions by source of payment. All differences discussed in the text are statistically significant at the 0.05 level.

Findings

Overall (table 1, figures 1 and 2)

In 2017, the top 1 percent of persons ranked by their health care expenditures accounted for 21.9 percent of total health care expenditures (100 minus 78.1 percent; figure 1), with an annual mean expenditure of $116,331 (figure 2). The group within the top 1 percent is defined as persons who spent $66,454 or more during the year. Cut-points for additional percentile groups are shown in table 1. The top 5 percent of the population accounted for 50.1 percent of total expenditures (100 minus 49.9 percent), with an annual mean expenditure of $53,174. The bottom 50 percent accounted for only 2.9 percent of total health care expenditures. Persons in this group spent less than $1,051 during the year (table 1), with an average annual expenditure of $305.

Table 1. Percentile of population ranked by spending and amount spent during the year

Percentile of population	2017 Expenditure
Top 1%	$66,454 or more
Top 5%	$23,509 or more
Top 10%	$12,667 or more
Top 30%	$3,107 or more
Bottom 50%	Less than $1,051

Age (figure 3)

Older persons were disproportionately represented in the higher health care spending tiers (figure 3). Among the entire U.S. civilian noninstitutionalized population in 2017, 16.2 percent were 65 and older, while 22.7 percent were under age 18. Among the top 5 percent of spenders, however, 41.7 percent were 65 and older, while only 6.4 percent were children under age 18. In contrast, among the bottom 50 percent of spenders, 30.7 percent were children while only 5.5 percent were 65 years and older.

Race/Ethnicity (figure 4)

Whites were disproportionately represented among the top 50 percent of spenders, while Hispanics were underrepresented in this higher spending group. Whites comprised 59.9 percent of the U.S. civilian noninstitutionalized population in 2017 but accounted for 69.6 percent of the top half of spenders. Hispanics, on the other hand, comprised 18.3 percent of the population but only 12.5 percent of the top half of spenders.

Type of service (figure 5)

Compared to the overall population, expenses for persons in the bottom 50 percent of spenders were less likely to go toward inpatient stays or home health expenses (0.1 percent for each), and more likely to go toward ambulatory events (54.3 percent).

In the top 5 percent of spenders, on the other hand, 39.5 percent of their expenses were for inpatient stays. This comparatively high proportion of expenditures is a combination of the fact that persons in the top spending percentiles are much more likely to have at least one inpatient stay during the year, and those stays tend to cost more relative to other types of service.

Source of payment (figure 6)

Nearly half of aggregate expenses for the bottom 50 percent of spenders were paid for by private insurance (47.4 percent), while out-of-pocket payments accounted for around a quarter of the expenditures for this group (26.7 percent). Medicare payments comprised only 4.0 percent of payments for this low-spending group.

For persons in the top 5 percent spending tier, Medicare paid for 33.7 percent and private insurance paid for 38.6 percent of medical expenses. Out-of-pocket payments for this group comprised only 5.7 percent of total expenses.

Data Source:

The estimates shown in this Statistical Brief are based on data from the MEPS 2017 Full Year Consolidated File (HC-h201).

Definitions:

Age

Age was defined as age at the end of the year 2017 (or on last date of MEPS eligibility if person was out of scope at the end of the year).

Concentration curve

A concentration curve is a graphical representation of the distribution of a variable of interest, such as income or expenditures, across the percentage of the population. The cumulative percentage of the population is represented along the X-axis and the cumulative percentage of expenditures is represented on the Y-axis. A point at the X-axis value of 50% and the Y-axis value of 10%, for instance, indicates that the bottom 50% of the population accounts for 10% of total spending, and conversely, the top 50% accounts for 90% of total spending. Similarly, a point at the X-axis value of 99% and the Y-axis value of 82% indicates that the bottom 99% of the population accounts for 82% of spending, and conversely, that the top 1% of the population accounts for 18% of expenditures.

Expenditures

Total expenditures were defined as the sum of payments from all sources to hospitals, physicians, other health care providers (including dental care), and pharmacies for services reported by respondents in the MEPS-HC.

Percentiles
Percentiles of spending were formed by ordering sampled persons by their total expenditures from highest to lowest, then allocating persons to groups based on weighted percentage of the population. Near the cut point of each percentile, a person was included in the top percentile group if their added weight did not surpass the specified percentile. In the case of ties, where two or more people had the same expenditures close to a percentile cut point, the person with the lower weight was included in the higher percentile group. In this brief, the 'Bottom 50%' and 'Top 50%' are mutually exclusive, while the 'Top 50%', 'Top 30%','Top 10%', 'Top 5%' and 'Top 1%' are not.

Race/Ethnicity
MEPS respondents were asked if each family member was Hispanic or Latino and about each member's race. Based on this information, categories of race and Hispanic origin were constructed as follows:

- Hispanic
- White, non-Hispanic, with no other races reported
- Black, non-Hispanic, with no other races reported
- Asian, non-Hispanic, with no other races reported and other/multiple races, non-Hispanic

Sources of payment

- Out-of-pocket: Expenses paid by the user or other family member.
- Private insurance: Payments made by insurance plans covering hospital and medical care (excluding payments from Medicare, Medicaid, and other public sources). Payments from Medigap plans or TRICARE (Armed Forces-related coverage) are included.
- Medicare: Payments by Medicare which is a federally financed health insurance plan for persons age 65 and older, persons receiving Social Security disability payments, and persons with end-stage renal disease.
- Medicaid/CHIP: Payments by Medicaid and CHIP which are means-tested government programs jointly financed by federal and state funds that provide health care to those who are eligible. Medicaid is designed to provide health coverage to families and individuals who are unable to afford necessary medical care while CHIP provides coverage to additional low-income children not eligible for Medicaid. Eligibility criteria for both programs vary significantly by state.
- Other sources: Includes payments from the Department of Veterans Affairs (except TRICARE); other federal sources (Indian Health Service, military treatment facilities, and other care provided by the Federal Government); various state and local sources (community and neighborhood clinics, state and local health departments, and state programs other than Medicaid/CHIP); Workers' Compensation; and various unclassified sources (e.g., automobile, homeowner's, or other liability insurance, and other miscellaneous or unknown sources).

Type of service

- Ambulatory: Includes office-based visits (visits to medical providers seen in office settings), hospital outpatient visits, and emergency room visits. Expenses for outpatient and emergency room visits include payments for services covered under the basic facility charge and those for separately billed physician services. Emergency room payments exclude expenses for emergency room services that are included in a hospital inpatient admission.
- Hospital inpatient: Includes room and board and all hospital diagnostic and laboratory expenses associated with the basic facility charge, payments for separately billed physician inpatient services, and some emergency room expenses incurred immediately prior to inpatient stays.
- Prescribed medicines: Includes expenses for all prescribed medications that were initially purchased or refilled during the year.
- Home health: Includes expenses for home care provided by agencies and independent providers.
- Dental and other: Includes payments for services to any type of dental care provider as well as expenses for care in all categories not specified as a separate category (e.g., medical equipment and supplies).

About MEPS

The MEPS-HC is a nationally representative survey that collects detailed information on health care utilization and expenditures, health insurance, and health status, as well as a wide variety of social, demographic, and economic characteristics for the U.S. civilian noninstitutionalized population. The MEPS-HC is cosponsored by the Agency for Healthcare Research and Quality (AHRQ) and the National Center for Health Statistics (NCHS). More information about the MEPS-HC can be found on the MEPS Web site at http://www.meps.ahrq.gov/.

References

The following methodology reports contain information on the survey and sample designs for the MEPS Household and Medical Provider Components (HC and MPC, respectively). Data collected in these two components are jointly used to derive MEPS health care expenditure data.

Cohen, J. *Design and Methods of the Medical Expenditure Panel Survey Household Component*. MEPS Methodology Report No. 1. AHCPR Pub. No. 97-0026. Rockville, MD. Agency for Healthcare Policy and Research, 1997. http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr1/mr1.pdf

Ezzati-Rice, T.M., Rohde, F., Greenblatt, J., *Sample Design of the Medical Expenditure Panel Survey Household Component, 1998-2007.* Methodology Report No. 22. March 2008. Agency for Healthcare Research and Quality, Rockville, MD. http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr22/mr22.pdf

Machlin, S.R., Chowdhury, S.R., Ezzati-Rice, T., DiGaetano, R., Goksel, H., Wun, L.-M., Yu, W., Kashihara, D. *Estimation Procedures for the Medical Expenditure Panel Survey Household Component.* Methodology Report #24. September 2010. Agency

for Healthcare Research and Quality, Rockville, MD.
http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr24/mr24.shtml

Stagnitti, M.N., Beauregard, K., and Solis, A. *Design, Methods, and Field Results of the Medical Expenditure Panel Survey Medical Provider Component (MEPS MPC) - 2006 Calendar Year Data.* Methodology Report No. 23. November 2008. Agency for Healthcare Research and Quality, Rockville, MD.
http://www.meps.ahrq.gov/mepsweb/data_files/publications/mr23/mr23.pdf

Suggested Citation

Mitchell, E.M. Concentration of Healthcare Expenditures and Selected Characteristics of High Spenders, U.S. Civilian Noninstitutionalized Population, 2017. Statistical Brief #528. February 2020. Agency for Healthcare Research and Quality, Rockville, MD.
http://www.meps.ahrq.gov/mepsweb/data_files/publications/st528/stat528.pdf

* * *

AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of health care in the United States. We also invite you to tell us how you are using this Statistical Brief and other MEPS data and tools and to share suggestions on how MEPS products might be enhanced to further meet your needs. Please email us at MEPSProjectDirector@ahrq.hhs.gov or send a letter to the address below:

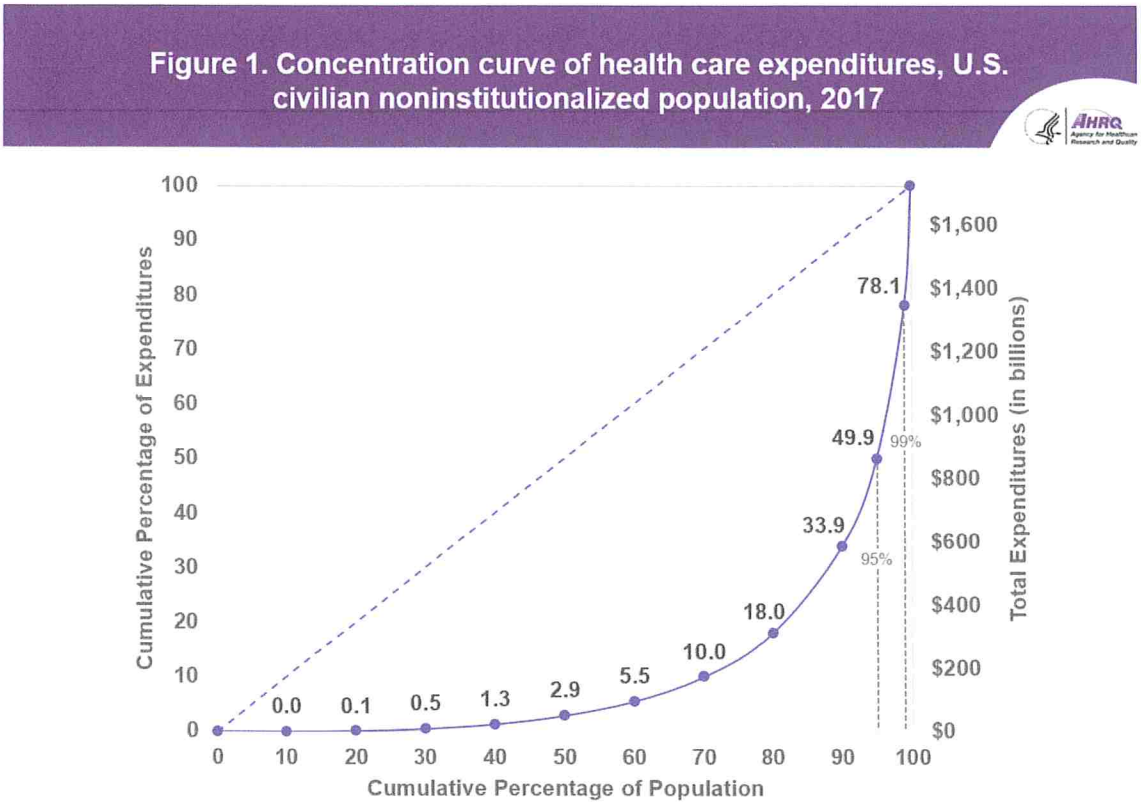
Joel W. Cohen, PhD, Director

Center for Financing, Access, and Cost Trends

Agency for Healthcare Research and Quality

5600 Fishers Lane, Mailstop 07W41A

Rockville, MD 20857

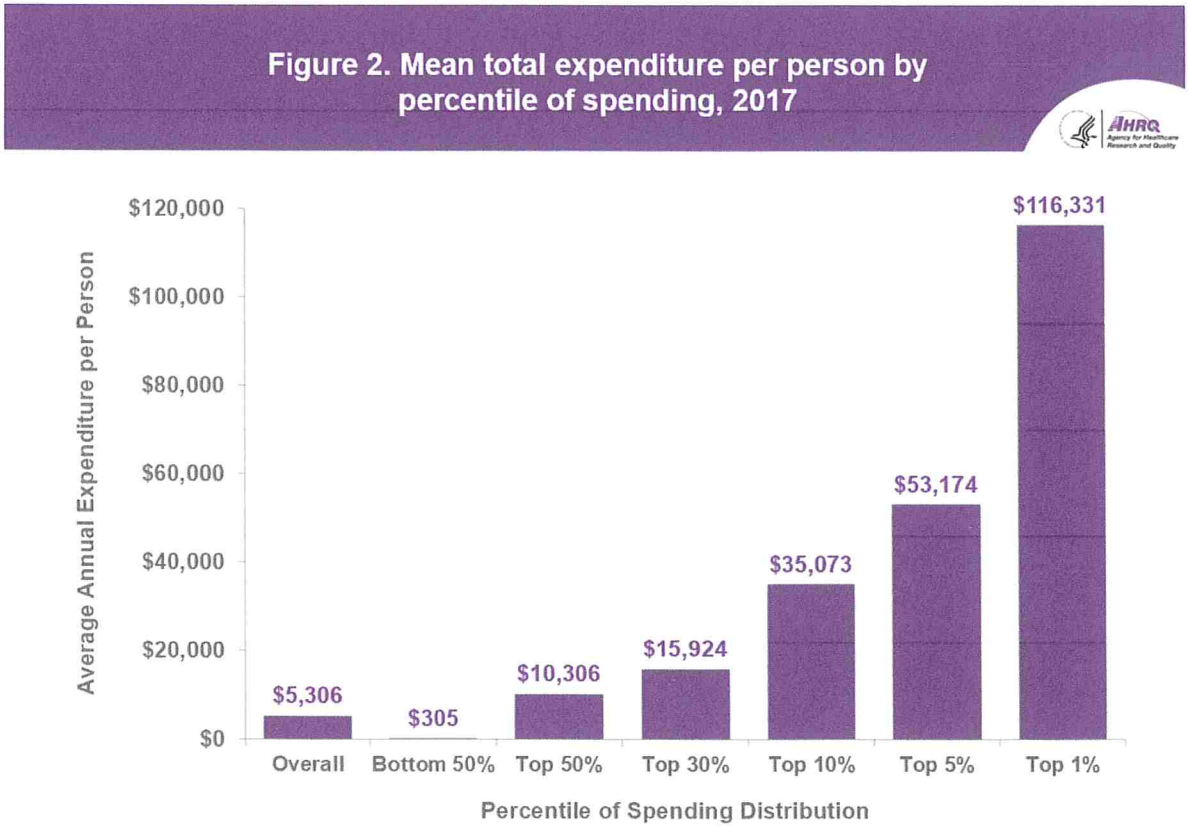


Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017.

Figure 1. Concentration curve of health care expenditures, U.S. civilian noninstitutionalized population, 2017

Cumulative Percentage of Population	Cumulative Percentage of Expenditures	Total Expenditures (in billions)
0	0.0	$0
10	0.0	$0
20	0.1	$1
30	0.5	$8
40	1.3	$23
50	2.9	$50
60	5.5	$95
70	10.0	$172
80	18.0	$311
90	33.9	$585
95	49.9	$860
99	78.1	$1,346
100	100.0	$1,723

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017

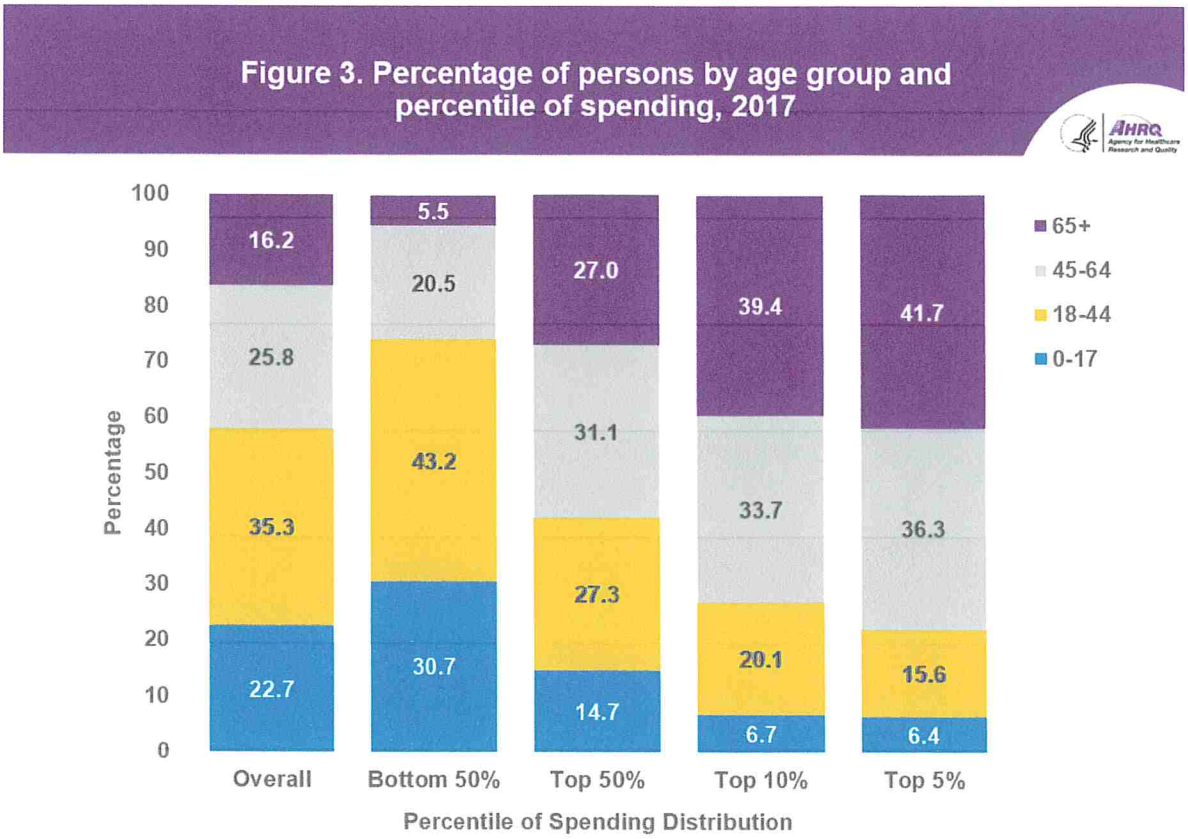


Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017.

Figure 2. Mean total expenditure per person by percentile of spending, 2017

Percentile of Spending Distribution	Average Annual Expenditure per Person
Overall	$5,306
Bottom 50%	$305
Top 50%	$10,306
Top 30%	$15,924
Top 10%	$35,073
Top 5%	$53,174
Top 1%	$116,331

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017

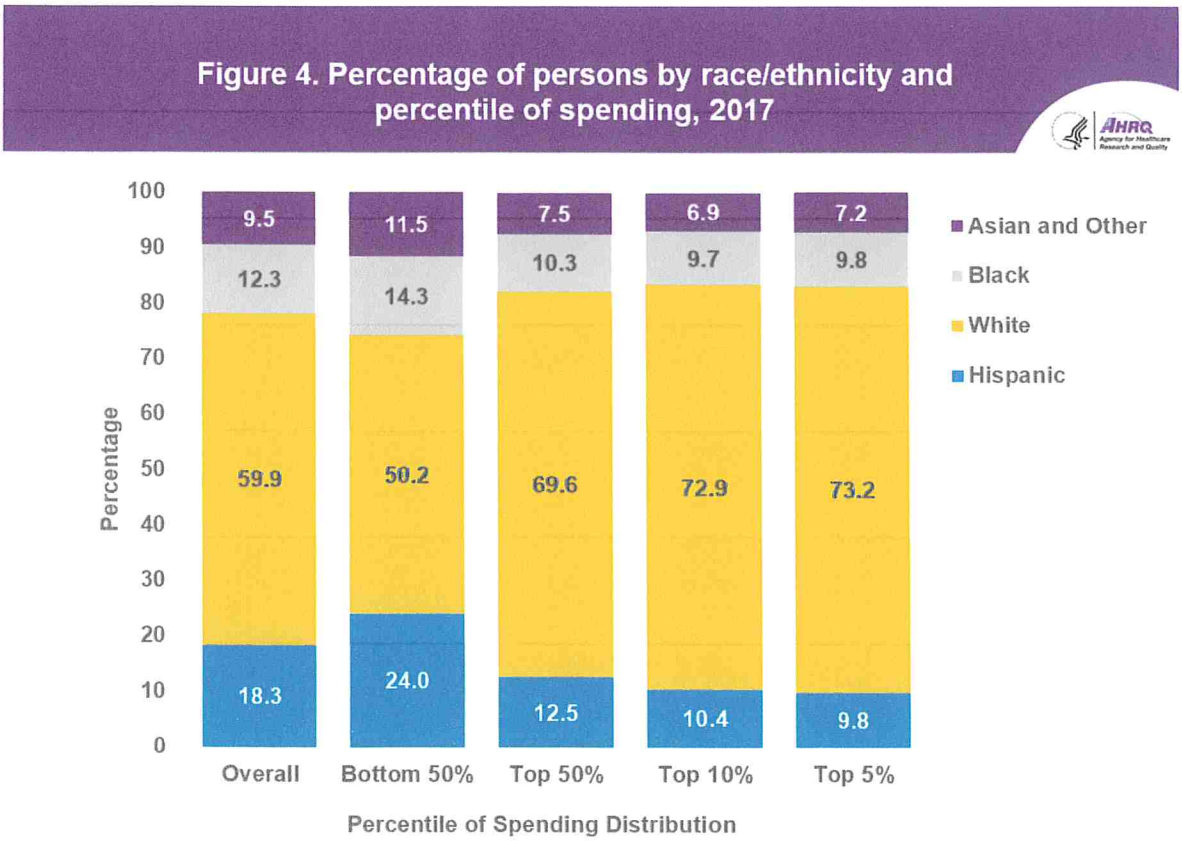


Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017.

Figure 3. Percentage of persons by age group and percentile of spending, 2017

Age Group	Overall	Bottom 50%	Top 50%	Top 10%	Top 5%
0-17 Years	22.7	30.7	14.7	6.7	6.4
18-44 Years	35.3	43.2	27.3	20.1	15.6
45-64 Years	25.8	20.5	31.1	33.7	36.3
65 Years and Older	16.2	5.5	27	39.4	41.7

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017



Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017.

Figure 4. Percentage of persons by race/ethnicity and percentile of spending, 2017

Race/Ethnicity	Overall	Bottom 50%	Top 50%	Top 10%	Top 5%
Asian and Other	9.5	11.5	7.5	6.9	7.2
Black	12.3	14.3	10.3	9.7	9.8
White	59.9	50.2	69.6	72.9	73.2
Hispanic	18.3	24	12.5	10.4	9.8

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017

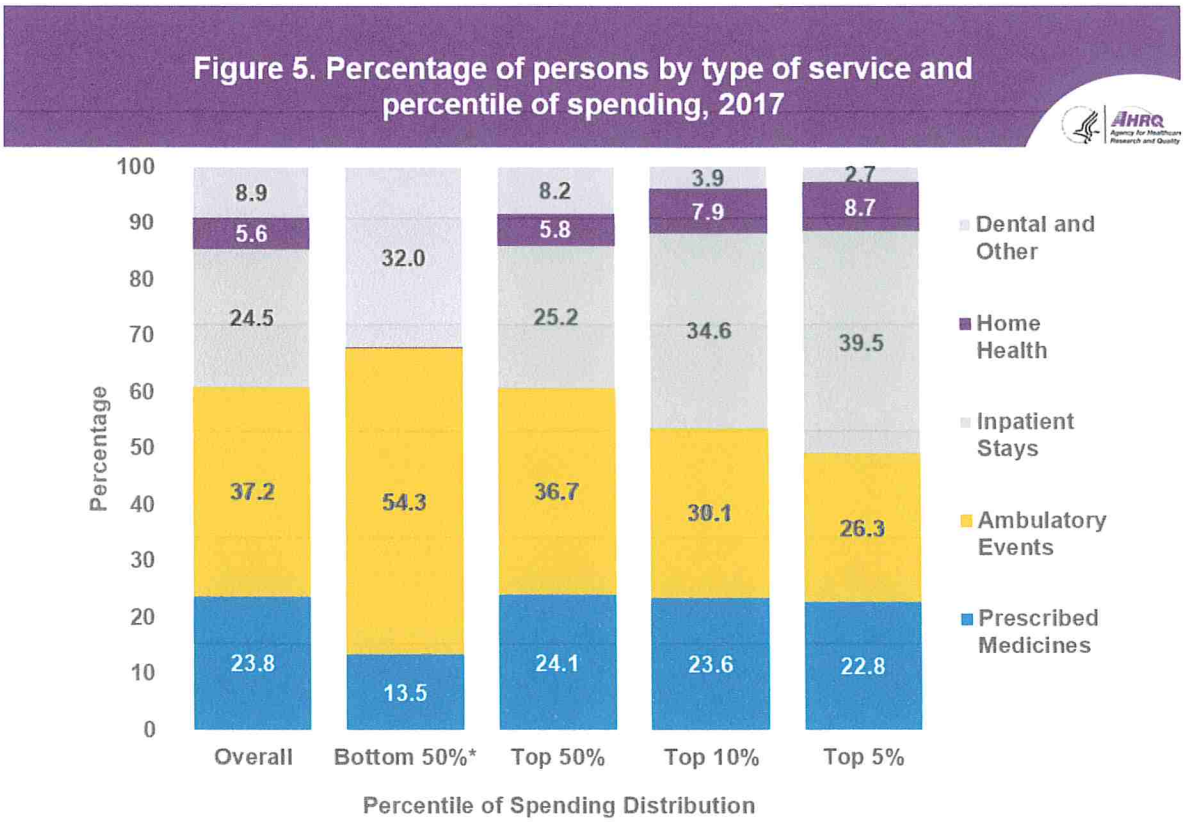
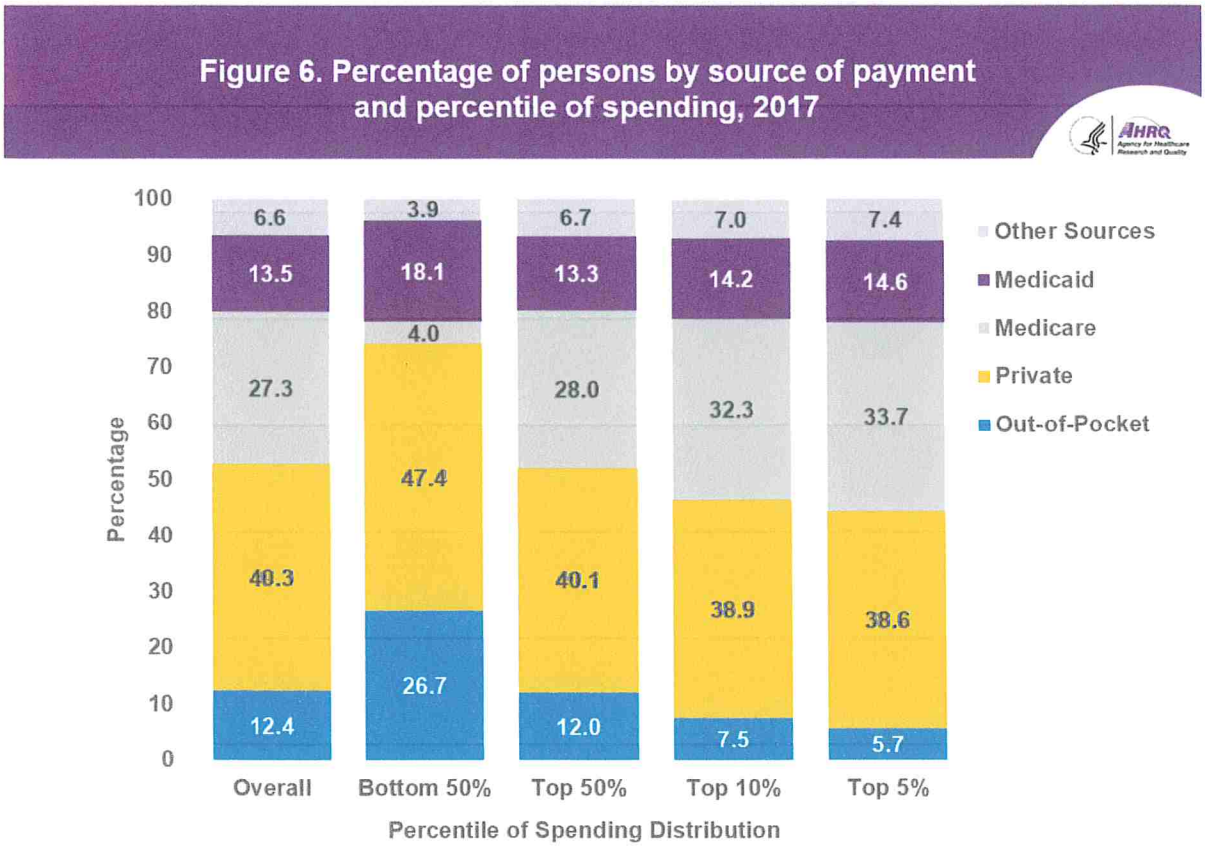


Figure 5. Percentage of persons by type of service and percentile of spending, 2017

Type of Service	Overall	Bottom 50%*	Top 50%	Top 10%	Top 5%
Dental and Other	8.9	32	8.2	3.9	2.7
Home Health	5.6	0.1	5.8	7.9	8.7
Inpatient Stays	24.5	0.1	25.2	34.6	39.5
Ambulatory Events	37.2	54.3	36.7	30.1	26.3
Prescribed Medicines	23.8	13.5	24.1	23.6	22.8

*Home health and inpatient stays each comprise 0.1% of the Bottom 50%

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017



Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017.

Figure 6. Percentage of persons by source of payment and percentile of spending, 2017

Source of Payment	Overall	Bottom 50%	Top 50%	Top 10%	Top 5%
Other Sources	6.6	3.9	6.7	7	7.4
Medicaid	13.5	18.1	13.3	14.2	14.6
Medicare	27.3	4	28	32.3	33.7
Private	40.3	47.4	40.1	38.9	38.6
Out-of-Pocket	12.4	26.7	12	7.5	5.7

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, Household Component, 2017

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Moral fatigue: The effects of cognitive fatigue on moral reasoning

Shane Timmons and Ruth MJ Byrne

Abstract

We report two experiments that show a moral fatigue effect: participants who are fatigued after they have carried out a tiring cognitive task make different moral judgements compared to participants who are not fatigued. Fatigued participants tend to judge that a moral violation is less permissible even though it would have a beneficial effect, such as killing one person to save the lives of five others. The moral fatigue effect occurs when people make a judgement that focuses on the harmful action, killing one person, but not when they make a judgement that focuses on the beneficial outcome, saving the lives of others, as shown in Experiment 1 ($n = 196$). It also occurs for judgements about morally good actions, such as jumping onto railway tracks to save a person who has fallen there, as shown in Experiment 2 ($n = 187$). The results have implications for alternative explanations of moral reasoning.

Keywords

Actions; depletion; moral fatigue; moral judgement; outcomes

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People make different decisions when they are tired, for example, judges make stricter parole decisions at the end of a decision session compared to at the start of a session (e.g., Danzigera, Levav, & Avnaim-Pesso, 2011; see also Mani, Mullainathan, Shafir, & Zhao, 2013; Spears, 2010). People may make different decisions when they are cognitively fatigued because their limited cognitive resources have been exhausted. They may no longer have sufficient capacity to allocate to new decisions (e.g., Baumeister & Heatherton, 1996; Schmeichel, Vohs, & Baumeister, 2003), or they may experience a reluctance to engage in further effortful processing (e.g., Inzlicht & Schmeichel, 2012). Their moral behaviour is also affected by the exhaustion of cognitive resources, for example, people are more inclined to cheat and deceive when they have carried out a task that is cognitively depleting, such as writing an essay with words that do not contain the letters "a" or "n" in it (e.g., Capraro & Cococcioni, 2016; Gino, Schweitzer, Mead, & Ariely, 2011; Mead, Baumeister, Gino, Schweitzer, & Ariely, 2009). We examine whether people experience decision fatigue for moral decisions about actions that violate a moral principle, such as harming one person, to bring about a beneficial outcome, such as saving many other people. Our novel aim is to test whether moral fatigue occurs because the exhaustion of cognitive resources affects people's ability to construct a model that links actions to outcomes, and instead fatigued participants construct a simpler model that highlights the immoral nature of the action rather than its morally beneficial consequences.

We gave participants moral dilemmas of the following sort (from Moore, Clark, & Kane, 2008):

> You are the explosives expert for a company that has been hired to demolish a skyscraper. You are examining the last of the explosive charges when you notice a teenager below who is about to accidentally detonate one of the charges out of sequence. This explosion will result in the building's uncontrolled collapse onto you, the teenager, and the crowd of spectators. The teenager is several floors below you and cannot hear you because of the loud demolition noise. You realize that the only way to stop the teenager from detonating the charge is to flip a switch that reactivates the building's electricity. Because he is touching an open circuit, this will electrocute him but will prevent the explosion.

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When people are asked whether it is permissible to kill the teenager, some people's judgements appear to reflect the deontological view that an action such as killing someone is a morally wrong violation of a core principle, whereas other people's judgements appear to reflect the utilitarian principle that a violation that leads to an outcome that benefits many people is justified (e.g., Baron, 2017; Białek & De Neys, 2017; Bonnefon, Shariff, & Rahwan, 2016; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001). We examine whether cognitive fatigue affects people's deontological and utilitarian judgements. People must allocate cognitive resources to weigh up the benefits of the outcome against the moral violation in the action when they make the utilitarian judgement that the action is permitted. Their judgements about such dilemmas require them to consider both the action and the outcome and how they are linked (e.g., Wiegmann & Waldmann, 2014). The utilitarian decision may depend on constructing a model that makes explicit the causal links between the otherwise immoral action, killing a person and its outcome, saving several other people (e.g., Crockett, 2013; Cushman, 2013; see also Lagnado, Gerstenberg, & Zultan, 2013; Parkinson & Byrne, 2017a, 2017b). The link between the action and the outcome provides a justification or reason for the action. People require sufficient cognitive resources to be able to simulate both components and their relations. Conversely, when people make the deontological decision that the action is not permitted, they may have evaluated the action in isolation from its outcome (e.g., Patil, 2015). The condemnation of the action may arise from representing the experience of performing the action, rather than the experience of the outcome (e.g., Miller, Hannikainen, & Cushman, 2014). People judge the action should not be taken when they mentally represent it vividly (e.g., Amit & Greene, 2012). Similarly, their moral judgements are affected when they focus on the actor rather than the recipient (e.g., Grey, Waytz, & Young, 2012; Grey & Wegner, 2009). And people remain averse to harmful actions even when the causal link to an outcome is removed, such as shooting a person with a fake gun (e.g., Cushman, Grey, Gaffey, & Mendes, 2012). Although people seem insensitive to the outcome when a moral judgement highlights the required action, such as harm caused to a protected value, their judgements can be changed by a focus on the beneficial outcome, such as the net benefits for the value (e.g., Bartels & Medin, 2007). Hence, we consider that cognitive fatigue may affect people's ability to construct a more complex model that links the action and the outcome, for example, to link the action of killing a person to the outcome of saving others. We test the idea that when participants are cognitively fatigued, they will be less able to construct such a model to reason about a dilemma, and so if they have constructed a model that focuses only on the immoral action, killing a person, they will be more inclined to judge that the action is not permitted.

Cognitive fatigue

We expect that a moral fatigue effect should occur if moral judgements depend at least in part on cognitive reasoning processes (e.g., Bucciarelli & Daniele, 2015; Bucciarelli, Khemlani & Johnson-Laird, 2008; Kohlberg, 1976; Piaget, 1932), rather than solely on automatic, emotional, or intuitive reactions (e.g., Damasio, 2000; Haidt, 2001; see also Pizarro & Salovey, 2002; Rozin, Lowery, Imada, & Haidt, 1999). People have limited abilities to carry out executive functions, such as allocating attention, manipulating information in working memory, and inhibiting prepotent responses (e.g., Baddeley, 1996, 2007; Smith & Jonides, 1999). One way to examine whether people rely on effortful reasoning processes to make moral judgements is to exploit their limited capacity, for example, to test their judgements under working memory load. The logic of dual-task designs is to rely on a simultaneous secondary task, to tax cognitive resources in parallel. Secondary task loads compromise executive functioning by dividing attention resources between the primary and secondary tasks (e.g., Gilbert & Hixon, 1991; Lavie, Hirst, De Fockert, & Viding, 2004; Ward & Mann, 2000). And secondary tasks have been found to affect moral reasoning, for example, the decision to violate a moral principle to bring about a greater good takes longer to make when the decision is made under conditions of cognitive load (e.g., Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008). Moreover brain regions associated with cognitive control have been implicated in moral judgements (e.g., Greene, Nystrom, Engell, Darley, & Cohen, 2004; Greene et al., 2001). The effects of secondary tasks on moral judgement have been taken to indicate that utilitarian moral judgements depend on controlled reasoning processes (e.g., Conway & Gawronski, 2013; Greene et al., 2008; Trémolière, De Neys, & Bonnefon, 2012), although it has also been argued that utilitarian and deontological judgements could both be rooted in intuition (e.g., Białek & De Neys, 2017; Landy & Royzman, 2018). Note that secondary tasks compete for cognitive resources and so their effects are different from cognitive tasks that encourage reasoning, for example, when participants carry out cognitive tasks that require deliberative thought such as those that comprise the cognitive reflection test, they subsequently make *more* utilitarian judgements, presumably because the prior cognitive tasks encourage controlled reasoning (e.g., Paxton, Ungar, & Greene, 2012; Yilmaz & Saribay, 2017). In contrast, secondary tasks compete for cognitive resources and lead to fewer utilitarian judgements. Analogously, the logic of a *sequential* task design is to exhaust cognitive resources by employing a sequential temporal load, that is, participants first carry out a cognitively exhausting task, and then immediately afterwards they engage in some higher-order cognitive task. Executive functions draw upon the same resource and when this resource becomes exhausted, people's ability to engage in higher-order cognitive processes

becomes impaired (e.g., Baumeister & Heatherton, 1996; Muraven & Baumeister, 2000; Schmeichel et al., 2003). For example, tasks that involve reasoning, cognitive extrapolation, and thoughtful reading comprehension are impaired when participants are cognitively fatigued, whereas less complex tasks, such as general knowledge tests and simple recall tests, are unaffected (e.g., Schmeichel, 2007). Hence, we aim to test whether people rely on reasoning to make moral judgements, by examining the effect of sequential cognitive depletion tasks on their moral judgements.

Reservations have been expressed about the phenomenon of depletion, in particular, about the effect size of sequential task-induced cognitive fatigue, which can be very small, at least for depleting tasks which participants do not experience as cognitively effortful or for depleting tasks that are demanding but not based on breaking a habit (see Baumeister & Vohs, 2016; Carter & McCullough, 2014; Dang, 2016; Hagger et al., 2016). In contrast, sequential task-induced cognitive fatigue appears to be robust in depleting tasks for which participants have formed a habit, such as writing essays, when they must do so without using the letters "a" and "n," or re-typing a paragraph, when they must do so without using the letter "e" or the spacebar (e.g., Hagger, Wood, Stiff, & Chatzisarantis, 2010; Muraven, Pogarsky, & Shmueli, 2006; Schmeichel, 2007). Our aim in the experiments we report is not to test claims made about the nature of depletion but rather to use the sequential load method of depletion studies, analogous to the simultaneous load method of working memory studies, to reduce reliance on cognitive resources. Our aim is to test whether people make different moral judgements when they are cognitively fatigued, specifically, whether people who are fatigued tend to judge that an action such as killing a person to save others, is less permissible compared to people who are not fatigued. We aim to examine whether differences in their judgements arise because they have constructed different sorts of models of the relation between an action and its outcome.

Experiment 1

The aim of the experiment was to examine whether a cognitive fatigue effect occurs for moral judgements because people construct a simple model that fails to explicitly link the action to the outcome when they are fatigued. Hence, we test whether participants who are fatigued make different judgements compared to participants who are not fatigued for judgements that focus on the action and judgements that focus on the outcome. We expect to observe a moral fatigue effect when the judgement explicitly mentions the action:

> Killing the teenager in this case is morally . . .

That is, we expect that participants who are fatigued will tend to judge that the action is less permissible compared to those who are not fatigued. However, we expect that when participants' attention is explicitly directed to the outcome, even those who are fatigued will construct a model that links the action to the outcome and tend to judge that the action is more permissible compared to when their attention is not directed to the outcome:

> Doing this in order to save yourself and the crowd of spectators is morally . . .

Hence we expect the moral fatigue effect will be diminished when participants make judgements that explicitly mention the outcome, compared to judgements that explicitly mention the action.

We manipulated one other factor primarily as a control. Many studies distinguish moral judgements about "impersonal" dilemmas in which the physical action is indirect, such as killing someone by flipping a switch to reactivate the building's electricity, and emotive "personal" dilemmas in which the physical action is more direct:

> You realize that the only way to stop the teenager from detonating the charge is to drop a heavy cinderblock on his head. This will crush his skull and kill him almost instantly but will prevent the out-of-sequence explosion.

Participants tend to judge that the action is not permitted in "personal" dilemmas and they tend to judge it is permitted in "impersonal" ones (e.g., Greene et al., 2001; Mikhail, 2007; Nichols & Mallon, 2006). We included personal and impersonal dilemmas merely to check whether any differences between fatigued and non-fatigued participants for action-focused and outcome-focused judgements occurred for the two sorts of dilemma. The personal and impersonal versions of the dilemmas differed only in the directness of killing, and controlled for potential confounds such as phrasing, number of deaths, and word length (from Moore et al., 2008; see also Paxton et al., 2012).

The participants' task was to make the following sort of judgement:

> Killing the teenager in this case is morally:
>
> 1____2____3____4____5____6____7
> Forbidden Obligatory

We chose the first-person perspective and asked for a normative judgement, rather than a predictive response such as "would you do it?" to control for potential confounds (e.g., Amit & Greene, 2012; Valdesolo & DeSteno, 2006; cf. Cushman, Knobe, Sinnott-Armstrong, 2008). There is considerable variation in the measures used in studies of moral judgement, which can make comparisons across studies difficult. Measures differ in their formats, from

forced-choice, dichotomous measures (e.g., Amit & Greene, 2012; Bucciarelli et al., 2008; Conway & Gawronski, 2013; Cushman, Sheketoff, Wharton, & Carey, 2013), to Likert-type scales (e.g., Bartels, 2008; Cushman, Young, & Hauser, 2006; Lombrozo, 2009), or both (e.g., Cushman et al., 2012; Paxton et al., 2012). There is also diversity in the type of normative judgement asked about the action, such as whether it is appropriate (Greene et al., 2008; Moore et al., 2008), wrong (Graham, Haidt, & Nosek, 2009; Laham, Alter, & Goodwin, 2009), acceptable (Bartels, 2008; Greene et al., 2009), permissible (Lombrozo, 2009; Ugazio, Lamm, & Singer, 2012), ethical (Paharia, Kassam, Greene, & Bazerman, 2009), or obligatory (Cushman et al., 2006; O' Hara, Sinnott-Armstrong & Sinnott-Armstrong, 2010). We chose a scaled response format, from forbidden to obligatory, with permissible as the implicit mid-point, rather than a dichotomous format, to allow a more nuanced response in that participants could indicate that an action was not permissible, or that it was permissible (but not necessarily obligatory), or that it was obligatory (e.g., Kahane & Shackel, 2010; see also Cushman et al., 2006; Verschueren, Schaeken, & d'Ydewalle, 2005). A scale that permits judgements not only of permissibility and impermissibility but also of obligation also allows the comparison of judgements about morally bad actions, examined in Experiment 1, and judgements about morally good actions, examined in Experiment 2. Moreover, for judgements about morally bad actions, some people consider actions such as harming one person to save others to be a permissible choice of a decision maker, rather than an obligatory duty, exhibiting a "moral minimalism," but others judge such actions to be obligatory, exhibiting a "strict utilitarianism" (e.g., Royzman, Landy, & Leeman, 2015). Similarly, for judgements about morally good actions, some people may think of actions such as carrying out a self-sacrificial action to save another person, as an obligatory duty whereas others may consider it merely a permissible choice (e.g., Algoe & Haidt, 2009). Our scale of forbidden through permissible to obligatory enables a more complete assessment of participants' judgements.

We examined not only participants' moral judgements but also how they felt about their moral decisions. The role of emotion in moral judgement remains controversial (e.g., Kahane, Everett, Earp, Farias, & Savulescu, 2015; Koenigs, Kruepke, Zeier, & Newman, 2012; Valdesolo & DeSteno, 2006; but see Landy & Goodwin, 2015). We examine emotion as a consequence of moral judgement, since depletion can affect emotion regulation (e.g., Baumeister, Vohs, & Tice, 2007; Hofmann, Rauch, & Gawronski, 2007; Johns, Inzlicht, & Schmader, 2008). Of course, people may anticipate how they will feel as a consequence of a moral decision and their anticipation may in turn affect the decision they make (e.g., Tasso, Sarlo, & Lotto, 2017).

Method

Participants. The participants were 196 individuals who completed the experiment on two online platforms, CrowdFlower and Prolific Academic. A further 28 participants were eliminated prior to analysis because English was not their first language ($n=4$), they had duplicate IP addresses ($n=2$), or they failed to carry out the instructions in the writing task to re-write the presented paragraph and not to type the letter "e" or use the spacebar key ($n=22$). There were 128 women and 63 men, 4 people who indicated their gender as other than male or female and 1 who indicated a preference not to say, and the average age was 33 years with a range from 18 to 69 years. We restricted participation to a set of countries that had English as a first language and so most of the participants were from the United States ($n=103$), the United Kingdom ($n=78$), Ireland ($n=8$), Australia ($n=4$), New Zealand ($n=2$), and Canada ($n=1$). Participants received a nominal payment in line with their platform norms; 25 cents (US$) on CrowdFlower and £1.50 (GBP) on Prolific Academic. They were assigned at random to one of four groups: fatigued-outcome ($n=41$), fatigued-action ($n=51$), non-fatigued-outcome ($n=58$), and non-fatigued-action ($n=46$). Sample size was initially calculated on the basis of a moderate to large effect size in laboratory-based cognitive depletion in most published studies and a high correlation between the repeated measures of personal and impersonal dilemmas (e.g., Hagger et al., 2010), that is, approximately 20 participants per cell. However, following comments on an earlier draft, sample size was subsequently reset to approximately 50 participants per cell in line with recommendations in Simmons, Nelson, and Simonsohn (2011) and further participants were recruited; in fact, the recalculated sample size made no difference to the results.

Materials and design. The design was a 2 (fatigue: fatigued vs. non-fatigued) × 2 (dilemma: personal vs. impersonal) × 2 (judgement: action vs. outcome) design, with repeated measures on the second factor. Participants were given four moral dilemmas, two personal and two impersonal, in randomised order (see the Supplementary material). We used four different contents for the moral dilemmas and assigned the contents at random to the personal and impersonal versions in two ways to create two sets, to control for content effects, and each participant received one set at random. For each dilemma, they were asked to make a moral judgement, for example,

Killing the teenager in this case is morally:

1____2____3____4____5____6____7
Forbidden Obligatory

They made their moral judgement on a scale from 1 (*forbidden*) to 7 (*obligatory*). Half of the participants were

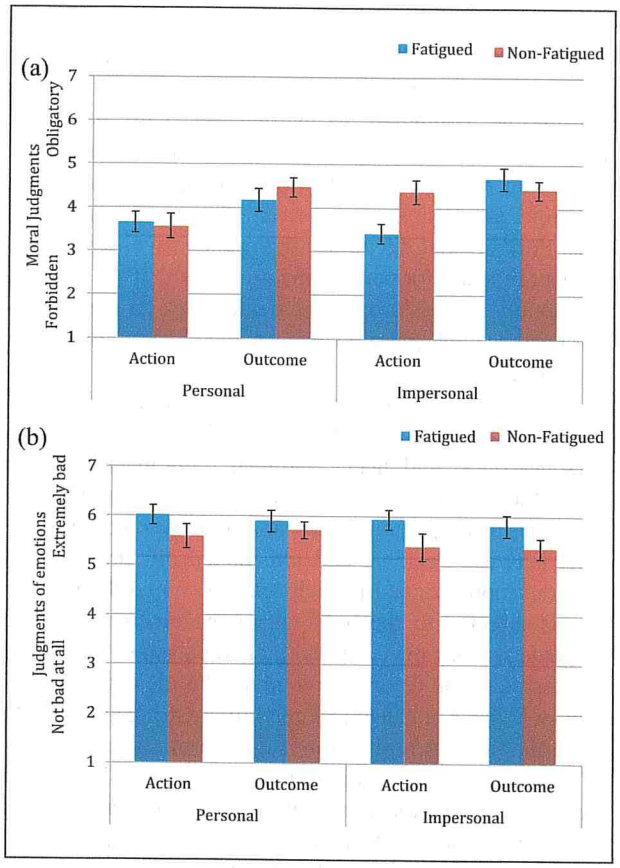

Figure 1. (a) Mean moral judgements and (b) mean emotion judgements, for morally bad dilemmas in Experiment 1. Error bars are standard error of the mean.

given the judgement framed to highlight the action, for example, "Killing the teenager in this case is morally . . ." and the other half were given the judgement framed to highlight the outcome, for example, "Doing this in order to save yourself and the crowd of spectators is morally . . ." Participants were also asked "how bad would this decision make you feel?" They rated how they felt about their decision from 1 (*not bad at all*) to 7 (*extremely bad*).

Participants completed an online depletion task (adapted from Muraven et al., 2006). They were asked to re-type one 150-word paragraph taken from a statistics book as quickly as possible. Then they were asked to re-type a second paragraph (see the Supplementary material). Participants in the fatigued group were told they were not to type the letter "e" or use the spacebar key, thus breaking a previously formed typing habit. Participants in the non-fatigued group were given no constraints. Participants rated the difficulty of the re-typing task, on a scale from 1 (*not at all difficult*) to 7 (*extremely difficult*), to determine whether it was sufficiently effortful, which is an important manipulation check for sequential task designs (see Dang, 2016). Other manipulation checks included the Brief Mood Introspection Scale (e.g., Mayer & Gaschke, 1988; see Schmeichel, 2007; Valdesolo & DeSteno, 2006), and they also rated the difficulty of each of the other tasks on a scale from 1 (*not at all difficult*) to 7 (*extremely difficult*), and the results are provided in the Supplementary material.

Procedure. The materials were presented using SurveyGizmo software, presented on CrowdFlower or Prolific Academic to recruit participants. Each dilemma was presented on a single screen with the scale below it. The other tasks were presented on separate screens. The experiment took approximately 20 min to complete.

Results and discussion

The raw data files for both experiments are available at: https://reasoningandimagination.wordpress.com/data-archive/

The manipulation checks confirmed that participants in the fatigue conditions rated their typing task ($Mdn=5$, interquartile range [IQR]=5-6) as more difficult than participants in the non-fatigue conditions ($Mdn=3$, $IQR=2$-5), Mann–Whitney $U=2{,}590.5$, $p<.001$, $r=.40$ (we provide medians and interquartile ranges for the manipulation checks because the data are ordinal based on single response Likert-type scales). They also rated the moral judgement task as more difficult ($Mdn=4$, $IQR=3$-6) compared to the non-fatigued participants ($Mdn=4$, $IQR=1.25$-5), $U=4{,}004$, $p=.046$, $r=.14$ (for further details, see the Supplementary material).

Participants tended to judge the actions to be permissible, with mean judgements of 4 on the 1 to 7 scale (in which 1 is *forbidden*, 7 is *obligatory*, and the mid-point 4 implicitly is *permissible*), as Figure 1a shows. Responses to personal and impersonal dilemmas were approximately normally distributed around the mean of 4 (skewness=−0.23 and −0.27; kurtosis=−0.88 and −0.86, respectively). We carried out a 2 (fatigue: fatigued, non-fatigued) × 2 (dilemma: personal, impersonal) × 2 (judgement focus: outcome, action) analysis of variance (ANOVA) with repeated measures on the second factor, on the moral judgements. The results showed that the three factors interacted, $F(1, 192)=13.64$, $p<.001$, $\eta_p^2=.07$, a medium effect size as Figure 1a shows. There was no main effect of fatigue, $F(1, 192)=1.08$, $p=.299$, $\eta_p^2=.01$; there was a main effect of judgement focus, $F(1, 192)=9.61$, $p=.002$, $\eta_p^2=.05$, as participants tended to judge that the action was less permissible when the judgement focused on the action rather than the outcome; and a main effect of dilemma, $F(1, 192)=5.75$, $p=.017$, $\eta_p^2=.03$, as participants tended to judge that the action was less permissible in personal dilemmas than impersonal ones. Fatigue did not interact with judgement focus, $F(1, 192)=0.94$, $p=.333$, $\eta_p^2=.01$, or dilemma type, $F(1, 192)=1.25$, $p=.266$, $\eta_p^2=.01$, and judgement focus did not interact with dilemma type, $F(1, 192)=0.93$, $p=.761$, $\eta_p^2=.001$.

We decomposed the significant three-way interaction to test our hypotheses about the expected differences between participants in the fatigued and the non-fatigued conditions and between action-focused and outcome-focused judgements, with a Bonferroni corrected alpha of .006 for the eight key comparisons. We expected to observe effects of fatigue for action-focused judgements, and the three-way interaction arises largely because such effects were indeed observed, but for impersonal dilemmas and not for personal ones, as Figure 1a shows. Fatigued participants judged actions in action-focused impersonal dilemmas to be less permissible compared to non-fatigued participants, somewhat marginally so on the corrected alpha, $t(95)=2.74$, $p=.007$, $d=0.56$; there were no other differences between fatigued and non-fatigued participants: action-focused personal, $t(95)=0.19$, $p=.847$, $d=0.04$; outcome-focused impersonal, $t(97)=0.79$, $p=.434$, $d=0.16$; and outcome-focused personal, $t(97)=0.86$, $p=.392$, $d=0.17$. Actions in action-focused judgements were judged less permissible than actions in outcome-focused judgements by fatigued participants in impersonal dilemmas, $t(90)=3.73$, $p<.001$, $d=0.79$; there were no other significant differences on the corrected alpha of .006 between action- and outcome-focused judgements: fatigued personal, $t(90)=1.52$, $p=.131$, $d=0.32$; non-fatigued personal, $t(102)=2.57$, $p=.012$, $d=0.51$; and non-fatigued impersonal, $t(102)=0.12$, $p=.902$, $d=0.02$.

Although our hypotheses did not concern the personal and impersonal factor, we note for completeness that non-fatigued participants tended to show the well-documented effect of judging that the action was less permissible for personal dilemmas than impersonal ones; the difference occurred for action-focused judgements, $t(45)=-3.99$, $p<.001$, $d=0.59$, but not for outcome-focused ones, $t(57)=0.25$, $p=.802$, $d=0.03$; fatigued participants showed no effects for action-focused, $t(50)=1.13$, $p=.263$, $d=0.16$, or outcome-focused judgements, $t(40)=2.04$, $p=.049$, $d=0.32$.

Participants indicated that they felt bad about their moral judgements, an average of about 5.5 on the 1 to 7 scale in which 7=extremely bad. An ANOVA of the same design on how participants felt about their judgements showed a main effect of fatigue, $F(1, 192)=4.12$, $p=.044$, $\eta_p^2=.02$, as fatigued participants reported feeling worse about their judgements; no main effect of judgement focus, $F(1, 192)=0.03$, $p=.859$, $\eta_p^2<.001$; and a main effect of dilemma type, $F(1, 192)=4.74$, $p=.031$, $\eta_p^2=.02$, as participants felt worse about personal compared to impersonal dilemmas; and no interactions of the variables: fatigue and dilemma, $F(1, 192)=1.44$, $p=.231$; fatigue and judgement focus, $F(1, 192)=0.18$, $p=.671$, $\eta_p^2=.001$; judgement focus and dilemma, $F(1, 192)=0.30$, $p=.588$, $\eta_p^2=.002$; and fatigue and judgement focus and dilemma, $F(1, 192)=0.25$, $p=.617$, $\eta_p^2=.001$, as Figure 1b shows.

The results show a moral fatigue effect for judgements about morally bad actions: participants who were fatigued judged that a bad action, such as killing a teenager by flipping a switch to reactivate a building's electricity, was less permissible compared to participants who were not fatigued, when the judgement directed their attention to the action but not when it directed their attention to the outcome; an effect that occurs only for impersonal dilemmas. For personal dilemmas, the frequently observed and robust tendency for participants to judge that the morally bad action, such as dropping a cinderblock on the teenager's head, is impermissible tends to overshadow any effects of fatigue.

The expected two-way interaction of fatigue and judgement focus occurs for impersonal dilemmas but not for personal ones, and hence fatigued participants tend to judge the action to be as impermissible for impersonal dilemmas as for personal ones, and so they do not discriminate between personal and impersonal dilemmas in the way that non-fatigued participants do. When their attention is directed to the outcome in the outcome-focused judgements, they make similar judgements to non-fatigued participants. The result corroborates the idea that participants who have engaged in a cognitively tiring task tend to judge that the harmful action is less permissible than participants who have engaged in a less tiring task because they construct a simpler model of the events that does not explicitly link the harmful action to its beneficial outcome. When their attention is explicitly directed to the outcome, however, they overcome this limitation.

Participants tended to judge the actions to be permissible (an average of 4 on the 1-7 scale), and we have described ratings of less than 4 as "less permissible" here. It could be argued that a rating of "3" or "2" is intended instead to indicate "forbidden" rather than "less permissible." However, it seems plausible that a participant who wished to indicate a judgement of "forbidden" would choose "1," which was labelled "forbidden."

The dilemmas used in the experiment have been widely used (e.g., Greene et al., 2001; Gürçay & Baron, 2017; Moore et al., 2008). Their content differs in important ways, such as the number of individuals to be saved, the relationship of the actor to the individual to be harmed, and whether the actor's own life is to be saved, and so the moral fatigue effect is not restricted to a particular sort of dilemma (see Supplementary Material). However, we note that the vaccine dilemma, although widely used, may be somewhat flawed: participants may believe they could determine which substance is the vaccine and which is the lethal one by testing only one substance, rather than both, and so there would be only a 50% risk of killing a person. Nonetheless, properties of a single dilemma cannot account for the differences we observed in the experiment, since participants in every condition received the same dilemmas. The next experiment examines whether the

moral fatigue effect occurs when people reason about morally good actions, such as the noble self-sacrificial deeds that lead to the experience of moral elevation.

Experiment 2

The aim of the experiment was to examine whether the cognitive fatigue effects observed for judgements about moral violations extend to judgements about morally good deeds, for judgements that focus on actions, and not for judgements that focus on outcomes. People are uplifted and inspired when they witness or read about acts of moral goodness, noble or self-sacrificial actions, such as a man jumping on the railway tracks to lie on top of another man who has fallen there, to save him from an oncoming train (e.g., Algoe & Haidt, 2009; Freeman, Aquino, & McFerran, 2009; Lai, Haidt, & Nosek, 2014). People often wish to emulate such moral goodness when they experience moral elevation (e.g., Algoe & Haidt, 2009; Cox, 2010; Schnall, Roper, & Fessler, 2010). Comparatively few studies have examined the cognitive processes underlying reasoning about morally good actions (for a review, see Pohling & Diessner, 2016). We test the idea that when people make judgements about whether such morally elevating acts should be taken, they must also construct a model in which they link the self-sacrificial act to the beneficial outcome. Hence, we predict that moral fatigue effects will occur even when people reason about self-sacrificial morally good actions.

We used the same design as the previous experiment to examine whether individuals who were fatigued made different moral judgements about these good actions. Our interest once again is in the interaction of fatigue with judgement focus, and we examine whether participants who are fatigued judge that an action such as jumping onto the railway tracks is less obligatory when the judgement focuses on the action rather than the outcome. For comparison with the previous experiment, we also include personal and impersonal self-sacrificial dilemmas. There has hitherto been no examination of whether people make different judgements about self-sacrificial dilemmas that are personal or impersonal and it is unknown whether it is a dimension of relevance for moral judgements about good actions. We created personal and impersonal versions of real newspaper stories, for example, in the personal version, the man jumped down on the tracks and laid on top of the person who had fallen there, whereas in the impersonal version, the man jumped down on the tracks and pulled a lever to divert the train onto another track away from the person who had fallen there. We framed the judgements to focus on the action, for example, "In your opinion, Mr Autrey jumping in front of the train in this case was morally . . ." or to focus on the outcome, for example, "In your opinion, doing this to save Mr Hollopeter was morally . . ."

Method

Participants. The participants were 187 volunteers who completed the study on the online platforms CrowdFlower and Prolific Academic. Prior to any data analysis, a further 6 participants were removed as English was not their first language and 19 were removed for failing to follow the instructions on the writing task. The participants were 115 women and 69 men and 3 participants reported their gender as other. Their average age was 35 years with a range from 18 to 72 years old. The participants were from the United States ($n=101$), the United Kingdom ($n=77$), Australia ($n=4$), Ireland ($n=2$), New Zealand ($n=1$), Canada ($n=1$), and one American participant in Venezuela. Participants received 25 cents (US$) on CrowdFlower and £1.50 (GBP) on Prolific Academic. They were assigned at random to one of four groups: fatigued-outcome ($n=46$), fatigued-action ($n=46$), non-fatigued-outcome ($n=46$), and non-fatigued-action ($n=49$). Sample size was calculated in the same way as the previous experiment.

Materials, design, and procedure. The design and procedure was the same as the previous experiment. The materials were two newspaper articles in their original form, as well as two modifications of them to create impersonal versions (see the Supplementary material). Participants read one personal and one impersonal story, and they received one version of each of the stories (i.e., either Subway-Personal and Baseball-Impersonal or Subway-Impersonal and Baseball-Personal). The stories were presented in a different randomised order for each participant. Participants made the same moral judgements as the previous experiment using the same scale from 1 (*forbidden*) to 7 (*obligatory*), they also judged how they felt about their decision in the same way as the previous experiment, and the depletion task was the same as the previous experiment.

Participants completed several manipulation checks including the mood scale and difficulty ratings used in the previous experiment. They also completed a shortened moral elevation scale to check that the stories were morally inspiring: they were asked to indicate how much they experienced or were still experiencing the following emotions or thoughts while reading the story (on a 1-7 scale where 1=*not at all* and 7=*a lot*): (1) inspired, (2) there is still some good in the world, and (3) the person in the story has shown me how to be a better person, and the results are provided in the Supplementary material. They completed the tasks in the following order: fatigue task, mood scale, moral elevation judgement, moral judgement, emotion judgement, and difficulty ratings.

Results and discussion

The manipulation checks confirmed that participants in the fatigue conditions rated their writing task as significantly

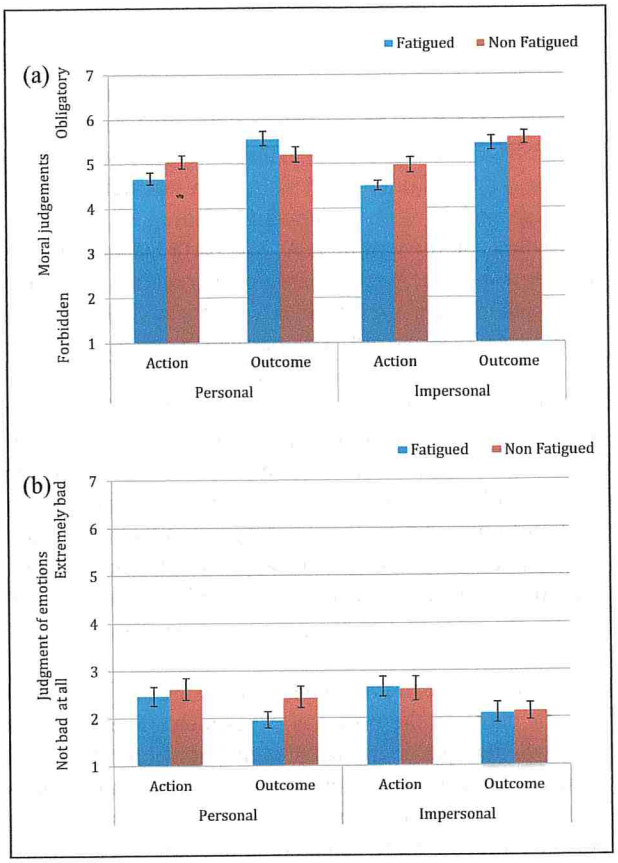

Figure 2. (a) Mean moral judgements and (b) mean emotion judgements, for morally good dilemmas in Experiment 2. Error bars are the standard error of the mean.

more difficult (*Mdn*=5, *IQR*=5-6) than those in the non-fatigue groups (*Mdn*=4, *IQR*=2-5), U=2,538, p<.001, r=.54; they did not differ in their ratings of the difficulty of the moral judgement task for the fatigue (*Mdn*=2, *IQR*=1-3) and non-fatigue conditions (*Mdn*=2, *IQR*=1-3), U=4,034, p=.341.

Participants tended to judge the actions to be somewhat obligatory, with mean judgements of 5 on the 1 to 7 scale (in which 7 is obligatory), as Figure 2a shows. Responses to personal and impersonal stories were approximately normally distributed around the mean of 5 (skewness=−0.29 and −0.03; kurtosis=0.61 and −0.39, respectively). An ANOVA of the same design as the previous experiment on moral judgements showed once again no main effect of fatigue, $F(1, 183)=1.33$, $p=.250$, $\eta_p^2=.01$, and once again a main effect of judgement focus, $F(1, 183)=26.72$, $p<.001$, $\eta_p^2=.13$, as participants tended to judge the action to be less obligatory for judgements that focused on the action rather than the outcome, and this time there was no main effect of dilemma, $F(1, 183)=0.01$, $p=.936$, $\eta_p^2<.001$. The key two-way interaction of fatigue and judgement focus was significant, $F(1, 183)=4.38$, $p=.038$, $\eta_p^2=.023$, a small effect size; fatigue and dilemma did not interact, $F(1, 183)=3.08$, $p=.081$, $\eta_p^2=.02$, nor did judgement focus and dilemma, $F(1, 183)=2.54$, $p=.113$, $\eta_p^2=.01$, and the three variables did not interact, $F(1, 183)=1.46$, $p=.229$, as Figure 2a shows.

The decomposition of the two-way interaction of fatigue and judgement focus with a Bonferroni correction of .0125 for four comparisons shows that fatigued participants tended to judge the action to be less obligatory for action-focused judgements than outcome-focused ones, $t(90)=5.50$, $p<.001$, $d=1.16$; there was no difference for the non-fatigued participants on the corrected alpha of $p<.0125$, $t(93)=2.06$, $p=.043$, $d=0.43$. Fatigued participants judged the action to be marginally less obligatory than non-fatigued participants for action-focused judgements on the corrected alpha of $p<.0125$, $t(86.13)=2.40$, $p=.018$, $d=0.49$; there were no differences between the groups for outcome-focused judgements, $t(90)=0.64$, $p=.525$, $d=0.13$. This two-way interaction of fatigue and judgement focus for morally good actions is consistent with the interaction of fatigue and judgement focus for morally bad actions observed in the previous experiment, for impersonal dilemmas. We note that the personal and impersonal nature of the dilemmas showed no main effect and did not interact with any other variable in this experiment, and we tentatively suggest that this factor may not be as influential for judgements about morally good actions as it is for morally bad actions.

Participants indicated that they did not feel bad about their moral judgements, an average of about 2 on the 1 to 7 scale in which 1=not bad. An ANOVA of the same design as the previous one on the emotion ratings showed that unlike the previous experiment, there was no main effect of fatigue, $F(1, 183)=0.68$, $p=.409$, $\eta_p^2=.004$, a main effect of judgement focus, $F(1, 183)=5.23$, $p=.023$, $\eta_p^2=.03$, as participants did not feel as good when they made judgements that focused on the action compared to judgements that focused on the outcome, as Figure 2b shows, and no main effect of dilemma, $F(1, 183)=0.10$, $p=.919$, $\eta_p^2<.001$. There was no interaction between fatigue and dilemma, $F(1, 183)=2.33$, $p=.129$, $\eta_p^2=.01$, or judgement focus, $F(1, 183)=0.27$, $p=.607$, $\eta_p^2=.001$; dilemma did not interact with judgement focus, $F(1, 183)=0.66$, $p=.417$, $\eta_p^2=.004$; and there was no three-way interaction, $F(1, 183)=0.37$, $p=.543$, $\eta_p^2=.002$. The lack of effects of fatigue on emotion judgements for self-sacrificial actions may suggest that these good actions require less justification for participants to evaluate them positively.

The experiment shows a moral fatigue effect for judgements about morally elevating actions—fatigued participants judged morally good actions, such as jumping on to the railway tracks, to be less obligatory when the judgement focused on the self-sacrificial action compared to when it focused on the beneficial outcome, saving a person who had fallen there; there was no effect for non-fatigued

participants. The result is consistent with the finding of the previous experiment in which fatigued participants judged morally bad actions, such as flipping a switch that would electrocute a teenager, to be less permissible when the judgement focused on the bad action compared to when it focused on the beneficial outcome, saving many others; there was no effect for non-fatigued participants. The difference between the two experiments is that the interaction of fatigue and judgement focus for morally bad actions occurred only for impersonal dilemmas, whereas for morally good actions, it occurred for both personal and impersonal dilemmas.

The results were observed using a scale that ranged from "forbidden" to "obligatory," with an implicit midpoint of "permissible," which we have suggested enables a more complete assessment of judgements suited for testing morally good outcomes as well as morally bad ones. The results of Experiments 1 and 2 suggest that it performed as expected. In any case, the nature of the scale does not modify the interpretation of the results, since the same scale was used in each condition in the experiments.

The results of the experiment again corroborate the idea that participants who have engaged in a cognitively tiring task construct a model of the events that does not explicitly link the action to its beneficial outcome, whether it is a morally good self-sacrificial action, or an action that violates a moral principle. When their attention is directed to the outcome, they overcome this limitation.

General discussion

Participants who have completed a cognitively tiring task tend to judge that a harmful action, such as killing a person, that leads to a good outcome, saving several others, is less permissible compared to participants who have completed a less cognitively tiring task. The moral fatigue effect occurs for judgements that focus on the harmful action but not for judgements that focus on the beneficial outcome: When their attention is directed to the outcome, fatigued and non-fatigued participants make similar judgements, as Experiment 1 shows. The result corroborates the idea that participants who have engaged in a cognitively tiring task judge that the harmful action is not permitted because they construct a simple model of the events that does not explicitly link the harmful action to its beneficial outcome. When their attention is directed to the outcome, they overcome this limitation. The effect occurs only for impersonal dilemmas—fatigued participants tend to judge that the action is less permissible for impersonal dilemmas just as much as for personal ones, and so they do not discriminate between personal and impersonal dilemmas in the way that non-fatigued participants do. Participants also show a moral fatigue effect for judgements about self-sacrificial good deeds. Participants who have completed a cognitively tiring task tend to judge that a helpful action that leads to a good outcome, such as jumping on to the railway tracks to save a person who has fallen there, is less obligatory compared to participants who have completed a less cognitively tiring task. Fatigued participants tend to judge that morally elevating good deeds are less obligatory when the judgement focused on the self-sacrificial action compared to when it focused on the beneficial outcome; there was no effect for non-fatigued participants, as Experiment 2 shows. The result corroborates the idea that participants who have engaged in a cognitively tiring task judge that a good action is less obligatory because they construct a simple model of the events that does not explicitly link the self-sacrificial action to its beneficial outcome.

When individuals are fatigued by tiring laboratory tasks, they make different moral judgements and feel worse about their judgements, compared to individuals who are not fatigued. We suggest that cognitive fatigue affects moral judgements because people construct a simpler model of events when they are fatigued, one that does not explicitly represent the links between the action and the outcome. An alternative explanation is that fatigued participants were less motivated to try to think about the moral dilemmas. However, the fatigued participants tended to judge that reasoning about the moral dilemmas was more difficult than non-fatigued participants, and their metacognitive perception of difficulty suggests they did at least attempt to think about the dilemmas.

We propose that the moral fatigue effect is consistent with results that show that moral judgement is susceptible to similar influences that affect reasoning and decision making more generally. In particular, we suggest that given that cognitive fatigue affects general reasoning tasks, the demonstration in our experiments that cognitive fatigue also affects moral reasoning tasks may be difficult to reconcile with suggestions that moral judgement is a unique and separate domain-specific faculty (e.g., Hauser, 2006; Mikhail, 2007). Many factors that affect reasoning and decision making in general also affect moral judgement, such as framing effects (e.g., Parkinson & Byrne, 2017b; Sinnott-Armstrong, 2008), foreign language effects (Costa et al., 2014; Geipel, Hadjichristidis, & Surian, 2016), processing fluency effects (Laham et al., 2009), and reasons for actions (Rai & Holyoak, 2010; Ritov & Baron, 1999). Moreover, individual differences in abilities such as working memory capacity, as well as in general cognitive style, also influence moral judgements (e.g., Bartels, 2008; Bartels & Pizarro, 2011; Moore et al., 2008), as does the presentation of multiple alternatives simultaneously rather than sequentially (Paharia et al., 2009; see also Lombrozo, 2009). The results thus corroborate suggestions that reasoning about moral matters relies on the same cognitive processes as reasoning about non-moral matters (e.g., Białek & De Neys, 2017; Bucciarelli & Johnson-Laird, 2005; Gubbins & Byrne, 2014; Parkinson & Byrne, 2018;

Wiegmann & Osman, 2017), such as the construction of a model that causally links the action to the outcome (e.g., Crockett, 2013; Cushman, 2013; Lagnado et al., 2013). Overall, the experiments reported here indicate that people reason differently about moral problems after they have completed cognitively exhausting tasks.

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Supplementary material

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moral fatigue effect occurs when people reason about morally good actions, such as the noble self-sacrificial deeds that lead to the experience of moral elevation.

Experiment 2

The aim of the experiment was to examine whether the cognitive fatigue effects observed for judgements about moral violations extend to judgements about morally good deeds, for judgements that focus on actions, and not for judgements that focus on outcomes. People are uplifted and inspired when they witness or read about acts of moral goodness, noble or self-sacrificial actions, such as a man jumping on the railway tracks to lie on top of another man who has fallen there, to save him from an oncoming train (e.g., Algoe & Haidt, 2009; Freeman, Aquino, & McFerran, 2009; Lai, Haidt, & Nosek, 2014). People often wish to emulate such moral goodness when they experience moral elevation (e.g., Algoe & Haidt, 2009; Cox, 2010; Schnall, Roper, & Fessler, 2010). Comparatively few studies have examined the cognitive processes underlying reasoning about morally good actions (for a review, see Pohling & Diessner, 2016). We test the idea that when people make judgements about whether such morally elevating acts should be taken, they must also construct a model in which they link the self-sacrificial act to the beneficial outcome. Hence, we predict that moral fatigue effects will occur even when people reason about self-sacrificial morally good actions.

We used the same design as the previous experiment to examine whether individuals who were fatigued made different moral judgements about these good actions. Our interest once again is in the interaction of fatigue with judgement focus, and we examine whether participants who are fatigued judge that an action such as jumping onto the railway tracks is less obligatory when the judgement focuses on the action rather than the outcome. For comparison with the previous experiment, we also include personal and impersonal self-sacrificial dilemmas. There has hitherto been no examination of whether people make different judgements about self-sacrificial dilemmas that are personal or impersonal and it is unknown whether it is a dimension of relevance for moral judgements about good actions. We created personal and impersonal versions of real newspaper stories, for example, in the personal version, the man jumped down on the tracks and laid on top of the person who had fallen there, whereas in the impersonal version, the man jumped down on the tracks and pulled a lever to divert the train onto another track away from the person who had fallen there. We framed the judgements to focus on the action, for example, "In your opinion, Mr Autrey jumping in front of the train in this case was morally . . ." or to focus on the outcome, for example, "In your opinion, doing this to save Mr Hollopeter was morally . . ."

Method

Participants. The participants were 187 volunteers who completed the study on the online platforms CrowdFlower and Prolific Academic. Prior to any data analysis, a further 6 participants were removed as English was not their first language and 19 were removed for failing to follow the instructions on the writing task. The participants were 115 women and 69 men and 3 participants reported their gender as other. Their average age was 35 years with a range from 18 to 72 years old. The participants were from the United States ($n=101$), the United Kingdom ($n=77$), Australia ($n=4$), Ireland ($n=2$), New Zealand ($n=1$), Canada ($n=1$), and one American participant in Venezuela. Participants received 25 cents (US$) on CrowdFlower and £1.50 (GBP) on Prolific Academic. They were assigned at random to one of four groups: fatigued-outcome ($n=46$), fatigued-action ($n=46$), non-fatigued-outcome ($n=46$), and non-fatigued-action ($n=49$). Sample size was calculated in the same way as the previous experiment.

Materials, design, and procedure. The design and procedure was the same as the previous experiment. The materials were two newspaper articles in their original form, as well as two modifications of them to create impersonal versions (see the Supplementary material). Participants read one personal and one impersonal story, and they received one version of each of the stories (i.e., either Subway-Personal and Baseball-Impersonal or Subway-Impersonal and Baseball-Personal). The stories were presented in a different randomised order for each participant. Participants made the same moral judgements as the previous experiment using the same scale from 1 (*forbidden*) to 7 (*obligatory*), they also judged how they felt about their decision in the same way as the previous experiment, and the depletion task was the same as the previous experiment.

Participants completed several manipulation checks including the mood scale and difficulty ratings used in the previous experiment. They also completed a shortened moral elevation scale to check that the stories were morally inspiring: they were asked to indicate how much they experienced or were still experiencing the following emotions or thoughts while reading the story (on a 1-7 scale where 1 = *not at all* and 7 = *a lot*): (1) inspired, (2) there is still some good in the world, and (3) the person in the story has shown me how to be a better person, and the results are provided in the Supplementary material. They completed the tasks in the following order: fatigue task, mood scale, moral elevation judgement, moral judgement, emotion judgement, and difficulty ratings.

Results and discussion

The manipulation checks confirmed that participants in the fatigue conditions rated their writing task as significantly

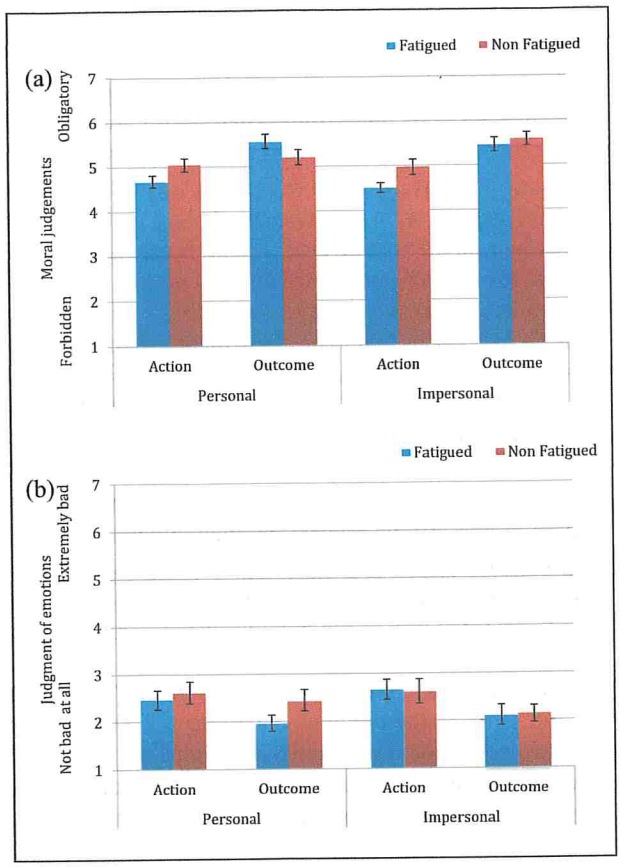

Figure 2. (a) Mean moral judgements and (b) mean emotion judgements, for morally good dilemmas in Experiment 2. Error bars are the standard error of the mean.

more difficult (*Mdn*=5, *IQR*=5-6) than those in the non-fatigue groups (*Mdn*=4, *IQR*=2-5), *U*=2,538, $p<.001$, $r=.54$; they did not differ in their ratings of the difficulty of the moral judgement task for the fatigue (*Mdn*=2, *IQR*=1-3) and non-fatigue conditions (*Mdn*=2, *IQR*=1-3), *U*=4,034, $p=.341$.

Participants tended to judge the actions to be somewhat obligatory, with mean judgements of 5 on the 1 to 7 scale (in which 7 is obligatory), as Figure 2a shows. Responses to personal and impersonal stories were approximately normally distributed around the mean of 5 (skewness=−0.29 and −0.03; kurtosis=0.61 and −0.39, respectively). An ANOVA of the same design as the previous experiment on moral judgements showed once again no main effect of fatigue, $F(1, 183)=1.33$, $p=.250$, $\eta_p^2=.01$, and once again a main effect of judgement focus, $F(1, 183)=26.72$, $p<.001$, $\eta_p^2=.13$, as participants tended to judge the action to be less obligatory for judgements that focused on the action rather than the outcome, and this time there was no main effect of dilemma, $F(1, 183)=0.01$, $p=.936$, $\eta_p^2<.001$. The key two-way interaction of fatigue and judgement focus was significant, $F(1, 183)=4.38$, $p=.038$, $\eta_p^2=.023$, a small effect size; fatigue and dilemma did not interact, $F(1, 183)=3.08$, $p=.081$, $\eta_p^2=.02$, nor did judgement focus and dilemma, $F(1, 183)=2.54$, $p=.113$, $\eta_p^2=.01$, and the three variables did not interact, $F(1, 183)=1.46$, $p=.229$, as Figure 2a shows.

The decomposition of the two-way interaction of fatigue and judgement focus with a Bonferroni correction of .0125 for four comparisons shows that fatigued participants tended to judge the action to be less obligatory for action-focused judgements than outcome-focused ones, $t(90)=5.50$, $p<.001$, $d=1.16$; there was no difference for the non-fatigued participants on the corrected alpha of $p<.0125$, $t(93)=2.06$, $p=.043$, $d=0.43$. Fatigued participants judged the action to be marginally less obligatory than non-fatigued participants for action-focused judgements on the corrected alpha of $p<.0125$, $t(86.13)=2.40$, $p=.018$, $d=0.49$; there were no differences between the groups for outcome-focused judgements, $t(90)=0.64$, $p=.525$, $d=0.13$. This two-way interaction of fatigue and judgement focus for morally good actions is consistent with the interaction of fatigue and judgement focus for morally bad actions observed in the previous experiment, for impersonal dilemmas. We note that the personal and impersonal nature of the dilemmas showed no main effect and did not interact with any other variable in this experiment, and we tentatively suggest that this factor may not be as influential for judgements about morally good actions as it is for morally bad actions.

Participants indicated that they did not feel bad about their moral judgements, an average of about 2 on the 1 to 7 scale in which 1=not bad. An ANOVA of the same design as the previous one on the emotion ratings showed that unlike the previous experiment, there was no main effect of fatigue, $F(1, 183)=0.68$, $p=.409$, $\eta_p^2=.004$, a main effect of judgement focus, $F(1, 183)=5.23$, $p=.023$, $\eta_p^2=.03$, as participants did not feel as good when they made judgements that focused on the action compared to judgements that focused on the outcome, as Figure 2b shows, and no main effect of dilemma, $F(1, 183)=0.10$, $p=.919$, $\eta_p^2<.001$. There was no interaction between fatigue and dilemma, $F(1, 183)=2.33$, $p=.129$, $\eta_p^2=.01$, or judgement focus, $F(1, 183)=0.27$, $p=.607$, $\eta_p^2=.001$; dilemma did not interact with judgement focus, $F(1, 183)=0.66$, $p=.417$, $\eta_p^2=.004$; and there was no three-way interaction, $F(1, 183)=0.37$, $p=.543$, $\eta_p^2=.002$. The lack of effects of fatigue on emotion judgements for self-sacrificial actions may suggest that these good actions require less justification for participants to evaluate them positively.

The experiment shows a moral fatigue effect for judgements about morally elevating actions—fatigued participants judged morally good actions, such as jumping on to the railway tracks, to be less obligatory when the judgement focused on the self-sacrificial action compared to when it focused on the beneficial outcome, saving a person who had fallen there; there was no effect for non-fatigued

participants. The result is consistent with the finding of the previous experiment in which fatigued participants judged morally bad actions, such as flipping a switch that would electrocute a teenager, to be less permissible when the judgement focused on the bad action compared to when it focused on the beneficial outcome, saving many others; there was no effect for non-fatigued participants. The difference between the two experiments is that the interaction of fatigue and judgement focus for morally bad actions occurred only for impersonal dilemmas, whereas for morally good actions, it occurred for both personal and impersonal dilemmas.

The results were observed using a scale that ranged from "forbidden" to "obligatory," with an implicit midpoint of "permissible," which we have suggested enables a more complete assessment of judgements suited for testing morally good outcomes as well as morally bad ones. The results of Experiments 1 and 2 suggest that it performed as expected. In any case, the nature of the scale does not modify the interpretation of the results, since the same scale was used in each condition in the experiments.

The results of the experiment again corroborate the idea that participants who have engaged in a cognitively tiring task construct a model of the events that does not explicitly link the action to its beneficial outcome, whether it is a morally good self-sacrificial action, or an action that violates a moral principle. When their attention is directed to the outcome, they overcome this limitation.

General discussion

Participants who have completed a cognitively tiring task tend to judge that a harmful action, such as killing a person, that leads to a good outcome, saving several others, is less permissible compared to participants who have completed a less cognitively tiring task. The moral fatigue effect occurs for judgements that focus on the harmful action but not for judgements that focus on the beneficial outcome: When their attention is directed to the outcome, fatigued and non-fatigued participants make similar judgements, as Experiment 1 shows. The result corroborates the idea that participants who have engaged in a cognitively tiring task judge that the harmful action is not permitted because they construct a simple model of the events that does not explicitly link the harmful action to its beneficial outcome. When their attention is directed to the outcome, they overcome this limitation. The effect occurs only for impersonal dilemmas—fatigued participants tend to judge that the action is less permissible for impersonal dilemmas just as much as for personal ones, and so they do not discriminate between personal and impersonal dilemmas in the way that non-fatigued participants do. Participants also show a moral fatigue effect for judgements about self-sacrificial good deeds. Participants who have completed a cognitively tiring task tend to judge that a helpful action that leads to a good outcome, such as jumping on to the railway tracks to save a person who has fallen there, is less obligatory compared to participants who have completed a less cognitively tiring task. Fatigued participants tend to judge that morally elevating good deeds are less obligatory when the judgement focused on the self-sacrificial action compared to when it focused on the beneficial outcome; there was no effect for non-fatigued participants, as Experiment 2 shows. The result corroborates the idea that participants who have engaged in a cognitively tiring task judge that a good action is less obligatory because they construct a simple model of the events that does not explicitly link the self-sacrificial action to its beneficial outcome.

When individuals are fatigued by tiring laboratory tasks, they make different moral judgements and feel worse about their judgements, compared to individuals who are not fatigued. We suggest that cognitive fatigue affects moral judgements because people construct a simpler model of events when they are fatigued, one that does not explicitly represent the links between the action and the outcome. An alternative explanation is that fatigued participants were less motivated to try to think about the moral dilemmas. However, the fatigued participants tended to judge that reasoning about the moral dilemmas was more difficult than non-fatigued participants, and their metacognitive perception of difficulty suggests they did at least attempt to think about the dilemmas.

We propose that the moral fatigue effect is consistent with results that show that moral judgement is susceptible to similar influences that affect reasoning and decision making more generally. In particular, we suggest that given that cognitive fatigue affects general reasoning tasks, the demonstration in our experiments that cognitive fatigue also affects moral reasoning tasks may be difficult to reconcile with suggestions that moral judgement is a unique and separate domain-specific faculty (e.g., Hauser, 2006; Mikhail, 2007). Many factors that affect reasoning and decision making in general also affect moral judgement, such as framing effects (e.g., Parkinson & Byrne, 2017b; Sinnott-Armstrong, 2008), foreign language effects (Costa et al., 2014; Geipel, Hadjichristidis, & Surian, 2016), processing fluency effects (Laham et al., 2009), and reasons for actions (Rai & Holyoak, 2010; Ritov & Baron, 1999). Moreover, individual differences in abilities such as working memory capacity, as well as in general cognitive style, also influence moral judgements (e.g., Bartels, 2008; Bartels & Pizarro, 2011; Moore et al., 2008), as does the presentation of multiple alternatives simultaneously rather than sequentially (Paharia et al., 2009; see also Lombrozo, 2009). The results thus corroborate suggestions that reasoning about moral matters relies on the same cognitive processes as reasoning about non-moral matters (e.g., Białek & De Neys, 2017; Bucciarelli & Johnson-Laird, 2005; Gubbins & Byrne, 2014; Parkinson & Byrne, 2018;

Wiegmann & Osman, 2017), such as the construction of a model that causally links the action to the outcome (e.g., Crockett, 2013; Cushman, 2013; Lagnado et al., 2013). Overall, the experiments reported here indicate that people reason differently about moral problems after they have completed cognitively exhausting tasks.

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Supplementary material

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outcome, derives from the child's attempts to metacognitively regulate differing social perspectives within shared agencies (Tomasello 2024)."

Note: *Agency* and *Free Will* have the same meaning.

—— NEIGHBORHOOD THEME ——

 # 4 of 6

PROSOCIALITY **NEIGHBORHOOD**

HEALTH **SOCIAL STIGMA**

POVERTY **POPULATION HEALTH**

PROSOCIALITY may be postulated for HEALTH as

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human behavior that is characterized by
social interaction scenarios involving volunteerism and altruism
by one or more *persons* to improve the Human Dignity
of another person or persons as guided by:
*) certain *Principles,* e.g., Autonomy,
Beneficence, Non-maleficence, and Justice;
*) certain *Interpersonal Rules,* e.g., Veracity,
Confidentiality, Privacy, Fidelity, and Respect;
*) certain *Action Ideals,* e.g., Forgiveness, Generosity,
Immediacy, Compassion, or Kindness; AND

*) certain *Social Norms* for Collective Action, e.g.,

Trust, Reciprocity, Cooperation, and Idle Talk.

(adapted from Beauchamp & Childress 8th Edit 2019)

COMMENT During the transition from early to late childhood, each person normally begins to engage more closely with their home's close neighborhood and the municipal life of their community. As the encounters with discordant social interactions begin to acquire a widening array of deference and demeanor skills, each person's personality and moral reasoning begin to intuitively acquire the spontaneity for maintaining their self-sufficiency. A positive connection with a father helps their children manage their male social interactions. Similarly, the same occurs for the children with their mother and her female social interactions.

Beforehand, this **Design Epistemology** included a definition for an Extended Family and its role in promoting contact between adolescent family members and familiar adults to mentor their prosocial behavior (see above). Lost in all of this, there is no intentional strategy to encourage locally-specific, norms of deference and demeanor for a community's traditions of prosociality (Goffman 1956). Ultimately, High Schools, Vocational certification schools, and Colleges that grant Baccalaureate Degrees may be the best institutionally sponsored sources to guide or sponsor this priority within the civic affairs of their associated community.

Importantly, the social cognition underlying the human attribute of "Human Sociality" begins before the onset of late childhood (Tomasello 2020). I cite another article by Michael Tomasello, especially given his analysis of the current status for the social development of each person's Prosociality during early adulthood (Tomasello 2019b): "THE ROLE OF ROLES IN UNIQUELY HUMAN COGNITION AND SOCIALITY."

< ADVERSE CHILDHOOD EXPERIENCES (ACEs) >

Karen Hughes and her Co-Authors reported an extensive analysis with an article entitled – "Health and Financial Costs of Adverse Childhood Experiences in 28 European Countries and North America: A Systematic Review and Meta-analysis (Hughes *et al.,* 2021)."

I cite a sentence from its **Findings** — "Harmful alcohol use, smoking, and cancer had the highest ACE-attributable costs in most countries. The ACE-attributable costs ranged from $0.1 Billion (Montenegro) to $129.4 Billion (Germany) and were equivalent to between 1.1% (Sweden and Turkey) and $6.0% (Ukraine) of their nation's Gross Domestic Product (Hughes *et al.* 2021)."

And from the article's **Interpretation** — "Millions of adults across Europe and North America live with the legacy of ACEs. Our findings suggest that a 10% reduction in ACE prevalence would equate to an annual savings of 3 million DALYs or $105 Billion. Programs to prevent ACEs and moderate their effects are available. Rebalancing expenditure towards ensuring safe and nurturing neighborhoods would be economically beneficial and relieve pressures on a nation's health-care systems (Hughes *et al.*, 2021)."

NEIGHBORHOOD may be postulated for HEALTH as

a cluster of resident persons within a community who
reside within a variously identifiable section of their community,
share certain cultural traditions within their social networks,
bond their caring relationships with close neighbors, and
initiate collective action, when necessary, to augment
the public symbols required by their section of the community.

COMMENT Like so many of the other concepts of the **Design Epistemology,** this definition is another concept characterizable by the iconic rubric for **quality,** *viz.*, "I know it when I see it." As a result, I prefer to use the concept of a Cluster for defining a Neighborhood. A *cluster* (see page 14) may be defined as "two or more bounded components that combine to form a uniquely resilient and sustainable capability from the emergent interactions involving *synergy* among the components, *affinity* between certain components, and *salutary conditions* surrounding the components."

For a **Neighborhood,** there are TWO communitarian components for every neighborhood: the PUBLIC obligations and the PRIVATE obligations. Each community's municipal, county, & state PUBLIC obligations encompass roads, public transportation facilities, utilities, primary & secondary education, public & fire safety, parks & recreation, historical monuments, libraries, post office, public health & its Primary Healthcare, Safety Net resilience, disaster preparedness, community sustainability, and promotion of its Social Cohesion. These PUBLIC obligations should also include their respective Justice and Fiscal responsibilities.

The PRIVATE obligations then are generally related to the support of higher education opportunities, employment alternatives, household shopping accessibility, diverse fine arts & their performance/exhibition facilities, philanthropy, ecological & cultural heritage, and social capital. For a common-sense reference, the MODELS OF NEIGHBORHOOD CHANGE essay by Kent P. Schwirian still retains its stalwart level of sensibility (Schwirian 1983).

Of interest for this concept, most research focuses on a neighborhood's adaptability to endure ecological and cultural change. Gentrification, racial & ethnic evolution, climate change, longevity & homicide, social isolation, and poverty are among the most prevalent arenas of knowledge warranting continuing sociological research. For a neighborhood, its sustainable attributes are then associated with its geographic location, especially as it becomes affected by its surrounding historically associated ecological and cultural identity.

Recently, a new arena of research has focused on neighborhood social networks with data from internet social networks. For one example of this research arena, I cite Dounia Mulders: "INFERENCE OF NODE ATTRIBUTES FROM SOCIAL NETWORK ASSORTATIVITY (Mulders 2020)." For an institutional tradition of research, I cite Robert J. Chaskin and his summary about the Chapin Hall Center for Children at the University of Chicago: "LESSONS LEARNED FROM THE IMPLEMENTATION OF THE NEIGHBORHOOD AND FAMILY INITIATIVE: A SUMMARY OF FINDINGS" (Chaskin 2000).

< ADVERSE CHILDHOOD EXPERIENCES (ACEs) >

We are now increasingly aware of the perinatal epigenetic factors that affect early childhood, neurological development. Here is a report on the use of a maternal Mediterranean-style diet (MSD) to prevent the occurrence of autism or hyperactivity during childhood (NDD). It represents a study by 7 University-associated, Co-Authors originating from either Maryland, Massachusetts, or Illinois (Che *et al.* 2023). The results identified a reduction in the incidence of NDD by **26%**, especially for women who were overweight with and without diabetes.

HEALTH may be postulated for a nation's **COMMON GOOD** as the experience of **Well-Being** that occurs for each of its resident persons when their lifelong survival has been

A. Endowed by a Family Culture that originates
before 'his or her' birth to promote a communal identity
among the caring relationships involving their Family,
Extended Family, and Close Neighborhood to sustain
the synergy between the person's innate temperament and
baseline homeostasis for building resiliency
during the fetal person's survival immediately after birth and
for 'his' or 'her' stable vitality thereafter from their parent-originated,
Personal **Survival** Plan to become a happy 'Dependent Person;'

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B. Nurtured by the person's caring relationships that originate
from within the person's Family, its Extended Family, and
their home's Close Neighborhood 1) during Early Childhood
with a goal to enrich the person's search for the broadest
portrayal of their *uniquely-endowed* Human Capability to
become a happy Dependendent person AND 2) during
Late Childhood and early Adolescence with a goal to mentor
the person's cultural and social-cognition for the broadest portrayal
of their *uniquely-endowed* Human Capability for becoming
a courageous Independent person with Free Will
within their Home's community after Adolescence;

^

C. Challenged by the person's encounter with *Chaotic Disruption*
involving discordant social interactions that begin before birth,
occur daily as interacting combinations and patterns, and cause
variably-reversible, beneficent, and maleficent changes to the
adaptive resilience of the person's *Human Quantum-Cognitive Brain*
as variously prevented, mitigated, and ameliorated lifelong
by the person's Family Culture, **by** the courageous
caring relationships originating from within 'his' or 'her' i) Family,
ii) Extended Family, and iii) Home's close neighborhood as well as
by their Personal **Survival** Plan, and

by the **Survival** Commons of their Home's community;

D. Matured by the person's encounter with *Chaotic Disruption* involving diversely complex, traumatic events that begin before birth, *occur* episodically as interacting combinations and patterns, and cause variably-irreversible, maleficent changes to the adaptive resilience of the person's *uniquely-endowed* Human Capability including its innate temperament and baseline homeostasis as prevented, mitigated, and ameliorated lifelong **by** their Family Culture, **by** the courageous caring relationships originating from within 'his or her' i) Family, ii) Extended Family, and iii) Home's Close Neighborhood as well as **by** their Personal **Survival** Plan, and **by** the **Survival** Commons of their Home's community; AND

*E. Sustained **by*** the person's Family Culture, **by** the hopeful caring relationships originating from 'his or her' i) Family, ii) Extended Family, and iii) Home's Close Neighborhood as well as **by** their Personal **Survival** Plan and **by** the **Survival** Commons of their Home's community until the entropy-laden resilience of the person's *uniquely-endowed* Human Capability is no longer sufficient to maintain 'his or her' survival as a result of their lifelong encounter with *Chaotic Disruption*.

COMMENT Milliman is a nationally recognized consulting company with periodic business connections involving the actuarial consultation needs of various health insurance companies. They have publically reported their analysis of the basic causes of Unstable Health. They are: Social Determinants – 40%; Behavioral – 30%; Healthcare Quality – 20%; and Genetics – 10%.

Given the Milliman findings, it is unlikely that the character of our nation's Population Health will improve with the strategy that is currently focused on improving our healthcare. Remember that our nation's

maternal mortality incidence has worsened nearly every year since 1975. Every year, there are nearly 300 Birthing Persons who likely die in association with pregnancy just because they were not living in a 'Scandinavian' nation at the time of conception.

< ADVERSE CHILDHOOD EXPERIENCES (ACEs) >

In 2021, the **JAMA Pediatrics|Review** published a report by Lucinda R. Grummit and 5 associates. The Co-Authors variously originated from Australia as well as from New York and Massachusetts. Here is its title: "ASSOCIATION of CHILDHOOD ADVERSITY WITH MORBIDITY IN US ADULTS a Systematic Review (Grummitt *et al.* 2021)." Here is the last sentence from its "CONCLUSIONS AND RELEVANCE. The prevention of Childhood Adversity and Disruptive **ACEs** that link these experiences to elevated disease risk must be considered a critical public health priority (Grummitt *et al.*, 2021)." I would add: nationally, community by community.

SOCIAL STIGMA may be postulated for a PERSON as

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an isolated social interaction involving 2 or more persons that
occurs unexpectantly for a variable interval of time,
involves a 'loss of *Human Dignity*' scenario, and
eventually *excludes* one or more of the participating persons
based on the perception of "Spoiled Identity"
by one or more of the other participating persons.

COMMENT This concept has many dimensions that inform the *Chaotic Disruption* concept underlying a person's Well-Being during their lifetime. Most importantly, Erving Goffman Ph.D. laid the groundwork for recognizing Stigma phenomena (Goffman 1963). Obviously, I cited his last book entitled "STIGMA Notes On The Management Of Spoiled Identity." The definition given above uses the template of SOCIAL INTERACTION as developed by Professor Goffman and included within this **Design Epistemology.** Human Dignity is also defined herein by Kai Moller, Ph.D. Eventually, this COMMENT will lead to citations that reflect current dimensions for understanding Stigma and its effect on a community's level of prosociality.

"CONCEPTUALIZING STIGMA"

We begin by citing an article, so named, from an Annual Review of Sociology (Link & Phelan, 2001). 15,571 Times since 2001, it has been cited by another article as of July 1, 2025. From its **Abstract,** I cite its first and last two sentences: "Social Science research on stigma has grown dramatically over the last two decades, particularly in social psychology where researchers have elucidated the ways in which people construct categories to stereotyped beliefs. [...] Finally, because there are so many stigmatized circumstances and because stigmatizing processes can affect multiple domains of people's lives, stigmatization probably has a dramatic bearing on the distribution of life chances in such areas as earnings, criminal involvement, health, and life itself. It follows that social scientists who are interested in understanding the distribution of such life chances should also be interested in stigma (Link & Phelan, 2001).

< ADVERSE CHILDHOOD EXPERIENCES (ACEs) >

"The Neighborhood as a Unit of Change for Health: Early Findings from the East Harlem Action Center" represents the title of a report by 17 co-authors (Dannefer *et al.,* 2020). I cite from its **Abstract:** "Interviewees felt that collaboration, being responsive to community needs, and being community-based were essential elements of the Action Center. Interviewees recognized the complex dynamic of a large city agency serving as the host for the Action Center while simultaneously aiming to establish more equitable relationships with partners. Governance Council members' expectations and hopes for the East Harlem Action Center were consistent with the overall vision for the Action Centers, which may facilitate implementation. (Dannefer *et al.* 2020)"

POVERTY may be postulated for a Community as

^

the *cognitive fatigue* by a person's Human Quantum-Cognitive Brain

that occurs from the incessant *Chaotic Disruption* associated with

the hypervigilant expression of 'his or her' adaptive skills

during the discordant Social Interactions occurring while

the person encounters their community's **Survival** COMMONS

to obtain its survival-related, Benefits and Obligations AND

during the discordant Caring Relationships encountered

while marginally maintaining their close neighborhood's home

for sustaining their own Personal **Survival** Plan and, if any,

the additional resident persons of 'his or her' Family.

COMMENT A person and their Family including its Family Culture, Extended Family, and their close neighborhood, *viz.* tribal unit, thus becomes the anthropologically fundamental unit for evolutionary human survival. The increasingly rapid worldwide population growth since 1800 has encountered a steady increase in the cultural and social complexity occurring within the civic life of every large city and its densely populated neighborhoods.

Each of these communities struggles with the complexities of housing needs, food insecurity, neighborhood safety, educational needs at a variety of levels, and the resultant complexities of their Population Health. Increasingly, Families need both parents to work for their Family's survival. Even so, poverty afflicts too many families, especially when encumbered with parental responsibilities. 'Lap time' for children contributes substantially to parental cognitive fatigue. Fred Rogers and this aphorism are cited within the article by Louisa Davidson (Davidson 2015).

"The roots of a child's ability to cope and thrive,

regardless of their circumstances,

lie in that child's having had at least a small, safe place

(an apartment? a room? a *lap?*) in which,

in the companionship of a loving person, that child could discover

that he or she was lovable and capable of loving in return."

Fred Rogers, Ph.D. (1928 – 2003)

Considering the effects of cognitive fatigue on parents who are coping with poverty, it is likely that 30-40% of all children may have missed the developmental process described above by Fred Rogers, Ph.D. That is, learning how to be lovable is the basis for acquiring the skills necessary to love others. Importantly, the intuitive character of these skills then underlies the caring relationships that are required within every Family. These adaptive skills then ameliorate the occurrence of cognitive fatigue for anyone.

Importantly, cognitive fatigue is known to degrade a person's moral reasoning processes while also responding to complex social interactions involving multiple alternatives for deciding what is best to do. This concept is more thoughtfully explored by Shane Timmons and Ruth MJ

Byrne (Timmons & Byrne, 2018). Ultimately, the complexity of POVERTY is immense.

Remember now, the potential benefit of frequent mealtimes is to manage the stress related to a family's Poverty endurance (Ee 2023). I cite the last sentence of the **ABSTRACT** from Ashley Teoh Synn Ee's report: "This study offers an extension to the current literature by examining the role food plays in family culture development (Ee 2023)."

TAXPAYER RELIEF ACT OF 1997 Expanded Child Tax Credit Act 1997 ("CTC")

"Since 1997, the original CTC benefit had been decreased prior to the COVID-19 pandemic spread to the USA (Robert Hovey 2024, p.590). In response to the COVID-19 pandemic and the economic downturn that followed, the federal government passed the American Rescue Plan Act ("ARPA") of 2021. Under ARPA, the government used the tax code to provide benefits to struggling families with children by temporarily expanding the Child Tax Credit (Robert Hovey 2024, p.590). Here is the title of the Robert Hovey citation: "A Road to Recovery: Why the Expansion of the Child Tax Credit Should Be Permanent."

< ADVERSE CHILDHOOD EXPERIENCES (ACEs) >

Research reports that evaluated the occurrence of **ACEs** on lifelong mental health began to occur around 30 years ago, *viz.,* 1997. A Reference published in a 2008 review listed the prior research articles regarding this problem (Afifi *et al.,* 2008). As of January 2024, it had been cited 701 times. Here is the Abstract of the Afifi report: "***Conclusions:*** **The estimated proportion of poor mental health outcomes attributable to adversity were medium to large for men and women. Prevention efforts that reduce exposure to adverse childhood events could substantially reduce the prevalence of psychopathology and suicidal behavior in the population."** The American Journal of Public Health published the report. Since 2019, a similar population analysis involving **ACEs** and diverse lifelong outcomes has been published on multiple occasions. I have cited **two:**

Danielsdottir, Hilda B. (2024). Its title is: "*Adverse Childhood Experiences and Adult Mental Health Outcomes."* This study focused on 25,252 adult twin pairs aged 18-47 years with a birth year between 1959 and 1998. The data was analyzed from April 2022 to November 2023. The occurrence of **ACEs** was subsequently associated with family violence, emotional abuse & neglect, physical abuse, sexual abuse, rape, hate crime, and correlated with the occurrence of depression & anxiety, alcohol or drug misuse, or stress-related disorders. The analysis took full advantage of its twin-pair (identical & fraternal) study group.

Harter, Cynthia L. & John F. R. Harter (2022). Its title is: "*The Link Between Adverse Childhood Experiences and Financial Security in*

Adulthood." A financial well-being study framework had been established by the Consumer Financial Protection Bureau. In addition, data was used from within a survey begun in 1984 by the Centers for Disease Control, *viz.,* its Behavioral Risk Factor Survey Alliance System (BRFSS). With 400,000 interviews annually, it represents the largest health survey system in the world. The initial sentence of the **Conclusion** states: "Having experienced more ACEs is correlated with having more financial stress in adulthood as measured by food security and housing security."

POPULATION HEALTH may be postulated **for** a NATION as

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a community's neighborhood-related
patterns of Unstable HEALTH that occur
among the community's resident persons as a result
of their community's neighborhood-related encounters with
emergent *Chaotic Disruption,* which variously disturb the *resilience*
of each resident person's Stable HEALTH and may require
an obligation by their community's **Survival** Commons
to prevent, mitigate, and ameliorate the harmful effects caused
by these recurring *Chaotic Disruptions,* and thereby minimizing their
disturbance to the continuing *resilience* of each neighborhood person's
innate temperament and *baseline homeostasis* for Stable HEALTH.

COMMENT Prior to the above definition, there has been a fitful effort for 20+ years to define POPULATION HEALTH as an independent phenomenon. As yet, there seems to be minimal progress toward achieving any converging consensus. An initial surge of multiple proposals by pre-eminent scholars occurred 15-20 years ago to explore a robust conception. These eminent scholars included Barbara Starfield (Starfield 2001), Sandro Galea (Galea *et al.* 2005), David Kindig (Kindig 2003 & 2007), and A DICTIONARY OF EPIDEMIOLOGY by Miquel Porta (Porta *et al.* 2014).

During 2021-22, another effort by several scholars suggested an even wider consideration for defining Population Health. I recognize the contributions from C.J. Peek (Peek *et al.*. 2021), Mark Fineberg (Fineberg

et al., 2022), David Kindig (Kindig 2022), and Craig McEwen (McEwen 2022). The definitions proposed herein attempted to encompass the Cosmological, Biological, and Human Dignity dimensions of every community's resident persons within their nation.

Most succinctly, an article appeared in the 2023 edition of The Milbank Quarterly (Lantz *et al.,* 2023). Using a medicalization theme for understanding the perils underlying the pervasive cost and "health equity" problems afflicting our nation's Human Dignity (Lantz *et al.,* 2023). It summarizes the paradigm paralysis underlying the institutional preoccupation with market share priorities within every community, especially our Nation's maternal mortality rate.

SURVIVAL COMMONS AND CHILDHOOD DEVELOPMENT

The POPULATION HEALTH definition, cited above, refers to a **Survival** Commons. Its full definition is on pages 62-64. The **Survival** Commons concept represents a definition that proposes to formally establish each community's responsibility to assess and refine the resiliency of its own Safety Net. Since the generational heritage of each community is unique, its own **Survival** Commons would identify the uniquely evolving occurrence of individual and family needs, especially with a focus on early childhood development. — 65 —

ADOLESCENT DEVELOPMENT

The complexity of this definition for "Population Health" may be most fully appreciated by a citation that refers to the lifelong career findings of Murray Bowen, M.D. (1913-1990). Some will remember his development of a Family Systems Theory. I have chosen a citation from a book written by his associate C. Margaret Hall, Ph.D. (Hall 1991) entitled BOWEN FAMILY SYSTEMS AND ITS USES. Here is the citation from pages 36-37 of the book:

"**One of the most important premises of Bowen's theory is that a family is the most tightly bonded emotional system an individual participates in for an extended period of time. Not only do family relationships, for most people, largely define a person's life situation at birth and in the years of early socialization, but they also strongly affect an individual's behavior at all stages of life. Even though family members may be widely dispersed geographically or separated through institutionalization or death, some degree of emotional "bondedness" persists, especially in relation to their family of origin.**

The emotional intensity of a family system increases during its relationship crises such as birth, abortion, loss, sickness, marriage, divorce, separation, institutionalization, or delinquency. According to Bowen's theory, it is more difficult to be a self in a family than to be a self in comparatively transient groups, which make fewer and less persistent demands. A related hypothesis is that self can be

differentiated more effectively in an individual's family, as other social contexts do not provide a sufficiently challenging, lasting, and reactive arena for this difficult sequence of behavior.

Effective differentiation of self generally creates a crisis in the emotional relationships of the differentiating person's family. Differentiation of self may also consist of planned responsible behavior in major crisis, such as death of a significant family member. Some preconditions appear necessary for successful differentiation. Only if relationship issues are dealt with in an emotionally reactive system that will not easily disband, can an individual respond fully to the feedback needed for long-term emotional maturation or differentiation. Only in a family network, can *solid self* most meaningfully encounter and deal with ingrained patterns of behavior which were and continue to be intimately related to self (Hall 1991)."

NOTE: As an aside to the above, I recommend a 'scoping review' article that focused on the current Bowen 'Family Systems' Theory (Calatrava M *et al.* 2022). It also has a focus on the 'Differentiation of Self' developmental transition.

COMMUNITY BY COMMUNITY

As a model for substantial change, the 63rd Congress passed the Smith-Lever Act in 1915 to establish the Cooperative Extension Service in connection with each State's federally supported College of Agriculture. "Extension" developed an intentional connection between the College of Agriculture and its state's farmer-operated food production. Thus, the "Ag Colleges became more familiar with their unresolved problems, and the farmers learned more precisely about newly evolving farming methods. As a result, our nation's farming industry represented approximately 60% of national total employment during 1930. By 2020, it was 1%. No other worldwide nation even approaches that level of efficiency. Argentina is the only nation that comes close at around 50% as efficient compared to the USA.

The same 63rd Congress also passed legislation to authorize the formation of the Federal Reserve. It functions as a semi-autonomous Federal institution with the responsibility to stabilize the value of the dollar within the international exchange of monetary assets. As a result, the stability of the US Dollar remains the essential basis for the international transfer of economic assets.

Obviously, we should not want for possible models to improve our nation's Population Health. Noteworthy, our nation's maternal mortality incidence has worsened steadily since 1975, especially since 2019. There is a very large commitment to improve the "quality" of maternal healthcare. However, there is essentially no pervasive evidence that it

has or will ever be substantially successful. An "antibiotic model" for identifying a positivist, reductionist model to reduce maternal mortality is unlikely to succeed, especially for certain ethnic Birthing Persons. This result has not occurred because of a lack of focus, commitment, or urgency from within our nation's healthcare industry regarding this devastating loss of Human Dignity. A nationally sanctioned, Complex Adaptive System will be required to apply a Population Health strategy with a generational, neighborhood-by-neighborhood focus.

To add a strategy for selecting a measurement typology for maintaining a population science analysis regarding stress measurement, I recommend pages 163 and 164 of the 2018 report by Elissa S. Epel and her seven associates (Epel 2018). Any effort to implement a Complex Adaptive System to guide the justly efficient and predictably effective attributes of our Nation's Stable HEALTH will require, presumably, 810 District Communities. Each will establish, regionally publish, and regularly refurbish their own **Survival** Commons and its monitoring progress.

Given the early-century, paralysis afflicting our nation's Federally centralized and autocratic government, we will eventually need to consider a State-by-State, strategic process. Ultimately, the State-by-State strategy must begin simultaneously within a 3-year "starting gate" by each of 810 contiguously connected, Community Districts. These Districts would, on average, encompass 400,000 resident persons. Each Community District would promote the formation of a Community HEALTH Forum to reduce the incidence of neighborhood-related Poverty and its Population Health associated deficits.

< ADVERSE CHILDHOOD EXPERIENCES (ACEs) >

Historically, Canada was the first nation to be faced with online access to Population Health data for its citizens, soon after 1975. This occurred after their healthcare system was financially nationalized in 1973. As a result, the Canadian Minister of National Health and Welfare initiated an analysis that was released in 1974. *viz.*, the Marc Lalonde Report: "**A NEW PERSPECTIVE ON THE HEALTH OF CANADIANS a working document"** (Lalonde 1974).

Subsequently, three reports focused on the occurrence of **ACEs.** First, I cite Clyde Hertzman who may be the initial pioneer for recognizing the critical developmental transitions that can be damaged by co-occurring events. With several related articles, I cite the most important: "The Lifelong Impact of Childhood Experiences: A Population Health Perspective" (Hertzman 1994). Second, I cite an article that may represent the first evidence to verify the relationship between low birth-weight at birth and maternal socioeconomic disadvantage. Here is the article's title: "Birth weight and later socioeconomic disadvantage: evidence from the 1958 British cohort study" (Bartley 1994). And finally, here is a report from an economist at the University of Toronto, Daniel

suddenly goes next, followed sequentially by the other two cars. The cars following the first and second cars are susceptible to an accident amidst this suddenly evolving "Social Dilemma." This represents a classic, public goods event in which there was a conflict between the individual and the collective interests involving the requisite expressions of trust, cooperation, and reciprocity among the participants.

Collective action situations have been studied extensively. The results generally indicate that some participants are more likely than others to intuitively apply trustworthy, cooperative, and reciprocal 'prosocial norms' for resolving a Social Dilemma encountered within a research study. They do the same while participating in the municipal life of their own community. Increasing each community's expression of 'prosocial norms' then becomes the basis for enhancing the resilience of their **Survival** COMMONS for the community's POPULATION HEALTH. As defined earlier, 'prosocial norms' are considered the basis for each community's level of Social Capital, *viz.*, as noted on page 64.

< ADVERSE CHILDHOOD EXPERIENCES (ACEs) >

Here is a review by a collaborative 'cluster' of 11 persons representing diverse academic pursuits within Australia (Mehta 2023) and its title – **Child Maltreatment and Long-Term Physical and Health Outcomes: An Exploration of Biopsychosocial Determinants and Implications for Prevention**. From the review's **Abstract,** I cite the following: "The review takes a systems approach to child maltreatment outcomes through its focus on the overall burden of disease, gene-environment interactions, neurobiological mechanisms, and social ecologies linking maltreatment to mental ill-health (Mehta 2023)." This may well represent one of those sentinel articles about mid-life mental health that will continue to be cited after 2034.

From the January edition of HEALTH AFFAIRS in 2025, a group of representative scholars from the Census Bureau, Centers for Disease Control (CDC), and the University of Michigan contributed a collaborative article entitled: "Adverse Childhood Experiences: Increased Likelihood of Socioeconomic Disadvantages for Young Adults (Ratcliff *et al.* 2025). Here are the 2nd, 3rd, and 4th sentences of the article's – **ABSTRACT** – "For this study of 930,000 children born during the period 1999-2003, we used linked administrative, survey, and criminal justice data to measure the association between ACEs (parental death; separation; incarceration; or criminal charge for intimate partner violence, substance use disorder, or child sexual or nonsexual abuse) and socioeconomic disadvantages at ages 18-22 during 2017-2021. After childhood socioeconomic status was controlled for, young adults with ACEs were more likely to have been charged with felonies, have become teenage parents, live in a household with poverty or housing assistance, be enrolled in Medicaid and not be employed, and were less likely to be

Trefler: "Looking Backward: How Childhood Experiences Impact a Nation's Wealth (Trefler 2004)."

—— COMMUNITY THEME ——

 # 5 of 6

SOCIAL DILEMMA INSTITUTION

COLLECTIVE ACTION COMMUNITY

SOCIAL CAPITAL SURVIVAL COMMONS

SOCIAL DILEMMA may be postulated as

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a social interaction involving two or more persons,
who assemble for a 'collective action' scenario
involving the distribution of a public good
within a definable time dimension,
for which one or more persons may choose
to acquire a short-term benefit for themselves rather
than expressing the prosocial norms that are necessary
for all the persons to receive the most equitable benefit.

COMMENT: Imagine an event involving four cars that arrive at a four-way, stop-sign-regulated intersection at about the same time. The first arrival, not fully stopping, goes first. One of the remaining three cars