Exhibit No.: _____
Issue(s): Affiliate Transaction Rules &
American Water Service Company/
Decoupling Mechanism &
Residential Usage/
Inclining Block Rates/
Future Test Year/
Single Tariff Pricing/
Lead Service Line Replacement
Witness/Type of Exhibit: Marke/Surrebuttal
Sponsoring Party: Public Counsel
Case No.: WR-2017-0285

SURREBUTTAL TESTIMONY

OF

GEOFF MARKE

Submitted on Behalf of
The Office of the Public Counsel

MISSOURI-AMERICAN WATER COMPANY

CASE NO. WR-2017-0285

February 9, 2018

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Missouri-American Water Company's Request for Authority to Implement General Rate Increase for Water and Sewer Service Provided in Missouri Service Areas.	))))	File No. WR-2017-0285

AFFIDAVIT OF GEOFF MARKE

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

Geoff Marke, of lawful age and being first duly sworn, deposes and states:

1. My name is Geoff Marke. I am a Regulatory Economist for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my surrebuttal testimony.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

Geoff Marke
Chief Economist

Subscribed and sworn to me this 9th day of February 2018.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

JERENE A. BUCKMAN
My Commission Expires
August 23, 2021
Cole County
Commission #13754037

Jerene A. Buckman
Notary Public

My commission expires August 23, 2021.

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OF

GEOFF MARKE

MISSOURI-AMERICAN WATER COMPANY

CASE NO. WR-2017-0285

I. INTRODUCTION

Q. Please state your name, title and business address.

A. Geoff Marke, PhD, Chief Economist, Office of the Public Counsel (OPC or Public Counsel), P.O. Box 2230, Jefferson City, Missouri 65102.

Q. Are you the same Dr. Marke that filed direct and rebuttal testimony in WR-2017-0285?

A. I am.

Q. What is the purpose of your testimony?

A. The purpose of this testimony is to respond to the rebuttal testimony regarding:

- Affiliate Transaction Rules & American Water Service Company
  - Missouri American Water Company ("MAWC" or "Company") witness James M. Jenkins
  - Missouri Public Service Commission Staff ("Staff") witness Kim Bolin
- Decoupling Mechanism & Residential Usage
  - MAWC witness James M. Jenkins and Gregory P. Roach
- Inclining Block Rates & Joplin
  - MAWC witness James M. Jenkins
- Future Test Year
  - MAWC witness James M. Jenkins
- Single Tariff Pricing
  - MAWC witness James M. Jenkins
- Lead Service Line Replacement
  - MAWC witness James M. Jenkins
  - Staff witness James A. Merciel, Jr., PE

- Missouri Division of Energy ("DE") witness Martin R. Hyman

Q. Has OPC's position changed since on any of the aforementioned issues since rebuttal testimony was filed?

A. No. OPC continues to support the Commission ordering an application of the affiliate transaction rules for large water utilities equal to what the Commission requires of electric and natural gas utilities. OPC also strongly recommends that the Commission reject the Company's request for a decoupling mechanism and future test year. Both requests are without merit in the context of this case. The Company's last minute attempt to offer up Joplin, Missouri as a test case for inclining block rates in exchange for decoupling mechanism is disappointing and clearly shows that they are not looking out for the public interest. There is no sound credible argument from any party on the record to support an inclining block rate.

Importantly, almost all interveners to this case are in alignment with OPC on the aforementioned issues.

OPC is in alignment with Staff on our position to maintain the current zonal pricing for MAWC customers. OPC cannot support the Company's request to abandon the principles of cost causation in its entirety.

Finally, OPC recommends that MAWC not be permitted rate recovery of imprudent costs. Specifically, the costs incurred associated from the lead service line replacement activity is not authorized by the Company's tariff, and therefore imprudently incurred and should not be recovered from captive ratepayers.

Lead service line replacement is a multi-layered, complicated problem, continually made more so by the Company's failure to provide support for how it plans to move forward with lead line replacement in the context of its proposed future test year. The issue of lead line replacement cuts across public health, scientific, technical, and legal arenas and should not be viewed as a linear engineering exercise alone. The potential health, economic and regulatory implications are far-reaching, unprecedented, and ultimately beyond the scope of the Commission's appropriate purview. Necessary stakeholders are absent and an open,

honest dialogue is required, which to date has been stunted. Given the depth of potential outcomes and risks, OPC firmly believes this is an issue for the Missouri legislature.

The Commission should be mindful that even the most well intentioned public policy initiatives have unintended consequences and the importance of those unintended consequences more often than not outweighs the intended consequences. For approximately one-year now, OPC has continually made its case to anyone that will listen that MAWC's cursory lead service line proposal is flawed on multiple levels and places enormous risk on the public at large. Instead of engaging in open and honest dialogue (or any dialogue), the rhetoric has either been muted, ignored or directed solely to how the Company can ensure the most cost recovery. We have now effectively lost a year, and to date, there is still nothing on the record from necessary and relevant fields of expertise to inform this policy. To cite the late Nobel Prize winning economist, Milton Friedman:

> One of the greatest mistakes is to judge policies and programs by their intentions rather than their results. We all know a famous road that is paved with good intentions.[1]

OPC urges the Commission to reject the Company's proposal and adopt OPC's pilot study as an appropriate and prudent path forward.

II. AFFILIATE TRANSACTIONS AND THE AMERICAN WATER SERVICE COMPANY

Q. Please summarize the positions in front of the Commission.

A. In direct testimony, OPC recommended that the Commission consider opening a rulemaking to establish affiliate transaction rules for water utilities and to order MAWC to create a new cost allocation manual ("CAM") guided by existing standards in place for other regulated utilities in Missouri within six months of the date of its Report and Order in this rate case.

[1] Heffner, R.D. (1975) The Open Mind: Interview with Milton Friedman For broadcast on WPIX, New York City, YouTube. https://www.youtube.com/watch?v=JfdRpyfEmBE

Staff supported OPC's recommendations. The Company has opposed them.

Q. Do you have any additional comments to make?

A. OPC has already pointed out the concerns centered on the Company's unregulated service line protection program particularly in light of its request surrounding full lead service line replacements. OPC encourages the Commission to visit the parent company's website at https://awrusa.com/ and ask whether or not it is an unreasonable request for the Company to differentiate its regulated and unregulated services to ratepayers[2] and confirm proper cost allocation to regulators? American Water is one of the largest investor owned utilities in the world with many regulated and non-regulated affiliates. In short, they are far more comparable to Ameren Missouri than a small water utility making this request for a Commission approved CAM appropriate and long-overdue.

III. DECOUPLING MECHANISM AND RESIDENTIAL USAGE

Q. Please summarize the positions in front of the Commission.

A. No party outside of the Company is supporting a decoupling mechanism. No party outside of the Company is relying on a ten-year estimate with an incongruent selection of months across zones to project future residential usage.

Q. Have other Commissions recently rejected a similar attempt by an American Water affiliate to secure a decoupling mechanism?

A. Yes. The Iowa Department of Commerce Board final "Decision and Order" in RPU-2016-0002 rejected Iowa American Water's proposed decoupling mechanism. The Iowa order states:

> Iowa-American asserts that the RSM will benefit customers with gradual adjustments in rates rather than larger adjustments at the time of a general rate case. However, since the RSM is designed to guarantee the company receives its revenue requirement, it is not clear how gradual such a shift would be. Iowa-American commented that the RSM would benefit customers because it would

[2] In a related aside, most Jefferson City residents received a mail flier from the American Water Company in the week prior to this filing offering its Water Line Protection Service.

> remove or substantially mitigate the contentious issue of the sales forecast from future rate cases, which the Board interprets as referring to the test year billing units. **The Board notes that the time previously spent on a request to adjust the test year's billing units would instead be spent evaluating the effectiveness of the RSM mechanism, likely resulting in little or no savings for customers.**
>
> **The mechanics of the proposed RSM also have the potential to result in interclass and intra-class subsidization for several reasons.** The proposed RSM would apply to all customer classes even though Iowa-American has based the need for the RSM on its analysis of declining residential per customer usage and weather variable consumption that is primarily residential. **Further, a shortfall in revenue for one customer class could be recovered from other customer classes.** For example, a general service customer that closes its business, resulting in a revenue decline for Iowa-American, would lead to an increase in the RSM surcharge recovered from all existing customers, or would reduce the RSM credit for all existing customers, shifting the costs of the general service class to other classes. **Further, the mechanism that collects revenues in one manner (on a per-unit basis) and returns over-collections in another manner (a credit equal in amount for all customers) could potentially refund more or less than the amount of over-collection received from each customer class.** Such refunds would also be disproportionate to usage.
>
> **The Board will reject the RSM as proposed by Iowa-American.** While there may be concerns over the impact on revenues due to declining residential base usage and weather variability, the RSM proposal offers no measureable goals on which the Board may evaluate the effectiveness of the mechanism and the proposed mechanics have the potential to result in interclass and intra-class subsidization.[3] (emphasis added)

Q. Does OPC have any additional comments to make on the issue of decoupling?

A. OPC maintains its original position that the Commission should reject the Company's request for a decoupling mechanism for many of the same reasons noted by the Iowa Department of Commerce Board. OPC does not oppose the use of decoupling tool in the proper context (e.g., electric utilities in states where energy efficiency resources standards are statutorily required); however, that is clearly not the case here nor is decoupling legally

[3] State of Iowa Department of Commerce Utilities Board (2017) Final Decision and Order. Iowa American Water Docket No. RPU-2016-0002, p.30-31.

permissible for water utilities. As it stands, approval of this regulatory tool would effectively function as a bill destabilization mechanism by needlessly shifting risk to ratepayers. Any approval of such a mechanism should be accompanied by a large, explicit reduction in the Company's approved Return on Equity ("ROE").

Q. Does OPC have any additional comments to make regarding residential usage estimates?

A. On January 24, 2018 the local CBS St. Louis news station included a news segment titled: "Customers Shocked by Water Bills After Hot, Dry Summer." The segment was transcribed on the stations website and reads as follows:

> **ST. LOUIS (KMOX)** – While many Missouri American Water Company customers are experiencing sticker shock, the company says there's a good reason for it.
>
> Spokesman Brian Russell says because last summer was twice as dry as 2016, people used more water. He says they've investigated several complaints with the same result.
>
> **"Every situation like this that we have investigated so far, from the meter to any other possibilities, has simply indicated an increase in usage on the part of the customer,"** he says.
>
> Russell says if you had a green lawn in 2017, you used a lot more water.
>
> Meanwhile, Missouri American has filed for a 45 percent rate increase, but Russell says it will likely be lower than that because of the reduced corporate tax rate in the new tax law.[4]

At least according to MAWC spokesman, Brian Russell, St. Louis County customers are paying more because they are using more which, at face value, would appear to be at odds with the Company's narrative in this case which is that customer use is declining.

OPC maintains its position that a five-year average is appropriate to inform just and reasonable rates moving forward. The projections put forward by MAWC witness Gregory P. Roach are largely based on expanding or contracting the sample size of his data to produce a favorable outcome as described in the surrebuttal testimony of OPC witness Lena

[4] KMOX (2018) Customers shocked by water bill after hot, dry summer. *CBS*. http://stlouis.cbslocal.com/2018/01/24/customers-shocked-by-water-bill-after-hot-dry-summer/

M. Mantle. There is nothing on the record substantiating efficient and impactful saturation of end-use water measures and the recent Mueller Meter investigation results and customer experience further challenge the creditability of MAWC's assertions.

IV. INCLINING BLOCK RATES

Q. Please summarize the positions in front of the Commission.

A. No party is formally supporting inclining block rates. Staff has developed an option, per the Commission's request, and Company witness Jenkins has since conditionally gone on record stating that:

> If the Commission is interested in pursuing inclining blocks, the Company would propose the implementation of a pilot program with inclining block rates in the Company's Joplin service area, conditioned on the approval of the proposed RSM across the Company's whole service area.[5]

Restated, the Company is seeking to abandon the principles of cost causation through single tariff pricing *and* is now suggesting that a large segment of its residential customers, solely in Joplin, could be charged a completely different inclining "pilot" rate *if* the Company is granted a decoupling mechanism by the Commission.

Q. What is OPC's opinion on this "conditional proposal?"

A. It appears as though the Company is making this up as it goes along. Or at least negotiating their position in testimony. OPC recommends that inclining block rates not be pursued in any form for MAWC customers in this rate case.

Q. Do you have any additional comments to make on this issue?

A. Yes. OPC presented a PowerPoint in Case No. EW-2017-0245 on May 18, 2017 titled: *Rate Design: Residential Electric Inclining Block Rates.*[6] In that presentation, I attempted to

[5] Rebuttal Testimony of James M. Jenkins, p. 5, 7-10.
[6] See GM-1.

provide a balanced perspective for the reasons for and against moving to a conservation-minded rate design. Although the presentation was specifically focused on residential electric customers, I made a point in stating that OPC did not support residential inclining block rates for natural gas or water ratepayers.

More recently, in Case Nos. GR-2017-0215 & GR-2017-0216 (Spire's rate case), it appears as though the Commission will likely order a residential "summer" inclining block rate design with a large residential customer charge, in part, to promote conservation. In the Spire case, like the current MAWC case, no party formally supported inclining block rates; however, Staff has developed an option, per the Commission's request again.

It is OPC's position that this recent trend is disappointing and not targeted at the correct utilities or circumstances. It will also 1) likely not accomplish the stated "conservation" signal hoped to be gained; 2) produce economic inefficiencies in the form of deadweight loss; and 3) stand to be potentially regressive in nature depending on the ultimate design.

Speaking purely to water, there is an argument to be made for both a temporary decoupling mechanism and an inclining block rate design during periods of extreme water crisis (see Southern California drought emergency).[7] In cases like that, pricing is extremely important and relevant (and much more effective than promoting demand-side water efficiency measures) in achieving conservation policy objectives. However, employing such methods during normal periods or when water is plentiful may only serve to minimize the impact a rate design can have when a crisis does present itself. Furthermore, the vast majority of water usage, on a whole, is not from residential homes. This underscores the impact such a conservation pricing scheme (focused solely on residential customers) would actually hope to produce in the face of an extreme drought. To provide a general overview, the US Geological Survey provides the following breakdowns listed in Figure 1 by water usage by state and Figure 2 which includes water usage by consumption category below:

[7] California Water Boards (2018) Emergency Conservation Regulation.
https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/emergency_regulation.html

Figure 1: 2010 Total Water Usage by State[8]

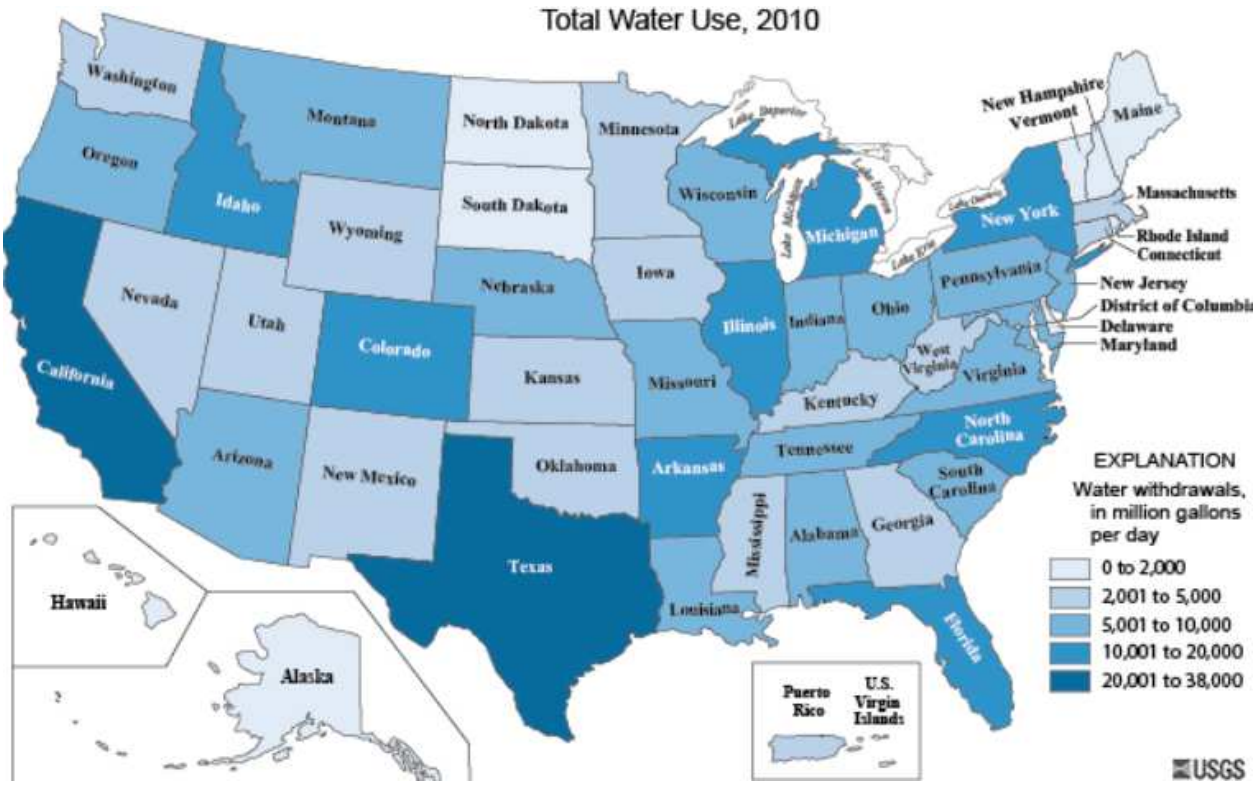
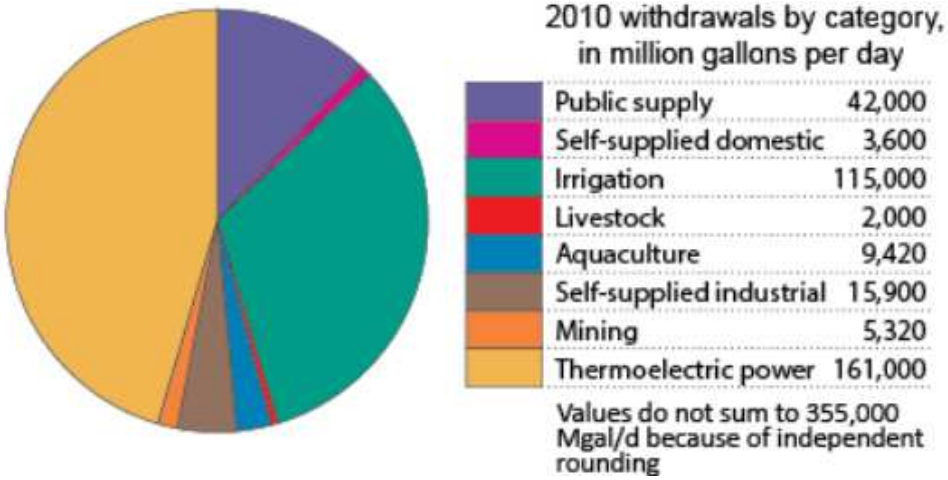


Figure 1: 2010 Total Water Usage by Category[9]



[8] USGA (2016) Water Use in the United States: Total Water Use https://water.usgs.gov/watuse/wuto.html
[9] Ibid.

Finally, OPC would offer, as an alternative, that any consideration for a large departure in pricing water service should be married and supported by substantive long-term resource planning that considers multiple scenarios, investments options and reliable, transparent and consistent data. It should also contain an evaluation that will provide the Commission with information on the effectiveness of the pricing plan. That level of detail and analysis has, to date, been absent and would clearly require a level of time and resources from the utility, regulators, and stakeholders that currently does not exist. Absent that support, it is highly unlikely that the perceived policy objectives (whatever those might be) will be realized.

V. FUTURE TEST YEAR

Q. Please summarize the positions in front of the Commission.

A. No party outside of the Company is supporting a future test year.

Q. Does OPC have any additional comments to make on this issue?

A. OPC continues to recommend that the Commission reject the Company's proposal for a future test year. The sheer volume of "unique regulatory requests" (e.g., 48.4% rate increase, cloud computing, AMI meters, future test year, decoupling, single-tariff pricing, inclining block rates, low income rates, 10.8% ROE, lead line replacement etc…) often with very little supportive justification, has been unprecedented. Stated differently, the amount of energy that has been necessary to refute MAWC's requests has been an order of magnitude greater than it was to produce it. The future test year is no different. As it stands, it is difficult to see how this case will even be properly resolved based off of the piecemeal information provided by the Company to support it. A future test year, as put forward by MAWC, is not in the public interest as was intelligently articulated by many customers at the local public hearings.[10]

[10] E.g., local public hearing, Volume 10, p. 26 (referencing the history of attempting to put Callaway Nuclear Plant into rate base before it was completed, the consumer said, "the concept is still there, thatn an expense should be complete to the utility before it could be charged to the customer.")

VI. SINGLE TARIFF PRICING

Q. Please summarize the positions in front of the Commission.

A. MAWC and the City of Riverside take the position of supporting single-tariff pricing. The Coalition Cities, Staff and MIEC oppose single-tariff pricing. The Coalition Cities support movement back to district specific pricing while Staff and MIEC support maintaining the current three zone districts.

Q. What is OPC's position?

A. OPC agrees with the arguments put forward by the Coalition Cities, Staff and MIEC. Putting aside our many policy objections articulated in direct testimony against single tariff pricing and given the brief amount of time that has elapsed since the last rate case (as well as the sheer volume of potential policy issues on the line in this case), OPC strongly suggests that the most prudent course of action would be to maintain the zones in their current alignment and revisit the issue in a future case if warranted. OPC's concerns surrounding the potential privatization of Missouri's water systems as a result of the both single-tariff pricing and lead service line replacement will be addressed in the next section.

VII. LEAD SERVICE LINE REPLACEMENT

Q. Please summarize the positions in front of the Commission.

A. MAWC, Staff and DE support cost recovery of lead service line replacement incurred in 2017 and presumably support the same treatment moving forward. OPC has opposed this argument on policy, accounting and legal grounds. Alternatively, OPC has designed an alternative path forward that would continue full lead service line replacement (for at least two years), ensure prudent expenditures and utilize attempt to minimize the seemingly many unintended consequences that are associated with removing a hazardous material on customer's premise. To suggest that no questions should be asked out of fear that the Company "may cease its practice" is not how regulation should operate.

Q. DE witness Mr. Hyman states that a reasonably priced (no more than $150,000), limited in scope study should be an acceptable outcome to alleviate OPC's concern. Please respond.

A. OPC is unsure how to respond to DE's recommendation. On the one hand, DE has been the only party to date to acknowledge that there is "at least some merit" to the questions OPC has raised regarding MAWC's lead service line replacement program. On the other hand, it is not entirely clear why DE, of all parties, is fixated on capping ratepayer expenditures associated with a study that clearly has implications for the health and wellbeing of Missouri citizens. OPC finds it curious that DE has no problem making numerous requests to subsidize the plethora of studies and projects related to its interests with ratepayer funds on the electric, gas (and now, recently water) side in almost every contested case, yet somehow feels that they need to opine on the appropriate cost estimate of a study related to a water company's excavation practices.

More importantly, this underscores the absurdity of how this seemingly important issue has regressed to date. Instead of engaging in meaningful dialogue with MAWC, regulators, epidemiological scientists, local community stakeholders, national experts, or university research teams, etc…, OPC is instead writing testimony (almost a year removed from when this issue came to our attention) in response to the State's Energy Office's cost estimate opinion on our lead service line replacement pilot project proposal.

Q. Staff witness Mr. Merciel states that "any such comprehensive LSL [lead service line] replacement studies [as proposed by OPC] should not be predicated upon MAWC cessation of its current practice of full LSL replacement."[11] Please respond.

A. OPC's pilot allows for the continued practice of full LSL replacement and, in fact, doubles the annual expenditure budget to date for the two-year pilot study period. OPC's pilot allowed for a two-year timeframe from which to collect, analyze and disseminate results. If the data were still inconclusive after two years OPC would not object to a reasonable

[11] Rebuttal testimony of James A. Merciel, JR., PE p. 3, 19-21.

extension. More importantly, if the study showed MAWC current practice was producing more harm than good, would Staff (or anyone) object to its continued practice? Staff's concerns appear inappropriate.

Q. Mr. Merciel also objects to OPC's proposed pilot program because it involves "non-jurisdictional issues" such as lead paint and real estate disclosure. How do you respond?

A. Mr. Merciel is correct that this is a complicated issue with many potential interdependent impacts. OPC would add that our concerns extend far beyond lead paint and real estate disclosure. From the onset, OPC has been adamant that the replacement of lead service lines should not be viewed in isolation or in a regulatory vacuum. This is why OPC believes this is an issue that should ultimately be decided by the Missouri Legislature. In the meantime, OPC's proposed pilot study enables the Commission to facilitate a proper path forward towards engaging relevant stakeholders and following best practices. OPC's pilot study was literally modeled off of the Lead Service Line Replacement Collaborative best practice framework. It is not entirely clear, what exactly Staff finds objectionable on this point. Utilities function under the purview of many regulatory bodies to provide safe and adequate service. Sometimes those functions intersect.

Q. What is Staff's response to OPC's acquisition that MAWC is in violation of its tariff?

A. Mr. Merciel, while not offering any legal conclusion, states he has experience with tariffs which includes:

- Authoring proposed rules;
- Reviewing proposed rules for reasonableness and compliance with Commission regulations;
- Recommending Commission approval of proposed rules;
- Applying approved **tariff** rules to actual situations involving customer-utility relations as questions and complaints arise.

Mr. Merciel then concludes by saying,

- *Very simply, MAWC is not taking any action that is not authorized by the tariff.*[12]

Q. Does OPC have a response?

A. This is a tautological argument, which is not a reasoned or supported argument. To be clear, Mr. Merciel' s argument is that he has experience with rules. OPC maintains that MAWC is in violation of its tariff as articulated in our post-hearing brief in WU-2017-0296. Each of the tariff provisions that MAWC is violating and the Company's actions in the WU-2017-0296 case are summarized in the Table 1 below:[13]

	Tariff Provision	Company's Action
1	PSC MO No. 13 Original Sheet No. R. 12, Rule 4.C makes clear "Any change in location and/or size of an existing service connection and/of service line requested by the customer shall be made at the Customer's expense."	Company is assuming the cost of replacing customer-owned service lines.
2	Tariff sheet PSC MO No. 13 Original Sheet No. R 12, Rule 4.I requires that "[f]or service at a new location, *a replacement service*, or additional service at an existing location, *applicant shall pay, in advance*, a service connection charge in accordance with approved tariff charges or as provided in these rules" (emphasis added)	Company is assuming the cost of replacing customer-owned service lines without requiring advance payment.
3	PSC MO No. 13 Original Sheet No. R. 12, Rule 4.J states, in part, "[t]he Customer's Water Service Line shall be installed by the Customer at that Customer's expense."	Company is assuming the cost of replacing customer-owned service lines.
4	PSC MO No. 13, 1st Revised Sheet No. R. 14, Rule 4.N states: When a service connection or service line is installed by the company "[t]he company will hold title to all such service connections, Service Lines and meter box installations installed by the company."	Schedule BA-SR3 purports to be an agreement between MAWC and the company wherein MAWC "will install a Customer connecting line from the Installation to Customer's residence." Adding the caveat "[t]he Customer connecting line is currently and will continue to be owned and maintained by Customer."

[12] Ibid. p. 6, 13-20.
[13] WU-2017-0296, *Office of the Public Counsel's Post-Hearing Brief*, filed October 19, 2017, p 8-10.

5	MAWC tariff sheet PSC MO No. 13 1st Revised Sheet No. R 16, Rule 6.B specifically addresses "all new or replacement Water Service Lines". At B.2 of the same tariff sheet, the law requires for all service areas (delineated separately in the tariff section based on customer ownership) that "the Customer shall be responsible for construction and maintenance of the Customer's water service line…".	Company is assuming the cost of replacing customer-owned service lines.
6	Tariff sheet PSC MO No. 13 1st Revised Sheet No. R 17.F demands "[c]ustomers at their own expense shall make all changes in their Customer Water Service Line required by changes of grade relocation of mains, or other causes."	Company is assuming the cost of replacing customer-owned service lines in connection with main replacement projects.
7	Tariff sheet PSC MO No. 13 1st Revised Sheet No. R 17.H requires that "[r]epairs or maintenance necessary on the Customer Water Service Line or on any pipe or fixture in or upon the Customer's premise … **shall be the responsibility of the Customer**." (Emphasis added).	Company is assuming the cost of replacing customer-owned service lines.
8	PSC MO No. 13 1st Revised Sheet No. R 9, Rule 2.D requires that all "written agreements shall conform to these Rules and Regulations in accordance with the statutes of the State of Missouri and rules of the Commission."	Company asks its customers to sign forms containing provisions contrary to the approved tariff (those forms can be found attached to MAWC witness Aiton's pre-filed surrebuttal as Schedule BA-SR3, pp. 3-8).
9	PSC MO No. 13 Original Sheet No. R 10, Rule 2.K provides that "[n]o employee or agent of the Company shall have the right or authority to bind it by any promise, agreement or representation contrary to the letter or intent of these Rules and Regulations of law."	Company asks its customers to sign forms containing provisions contrary to the approved tariff (those forms can be found attached to MAWC witness Aiton's pre-filed surrebuttal as Schedule BA-SR3, pp. 3-8).
10	PSC MO No. 13 Original Sheet No. R 11, Rule 3 defines the parameters surrounding MAWC's liability.	Schedule BA-SR3, p. 7 *extends* MAWC's (and its customers) liability with an additional putative agreement wherein MAWC "warrants the workmanship of its installation of its installation of the Customer service line for a period of 12 months ... [.]"

11	PSC MO No. 13 Original Sheet No. R 11, Rule 3.F prohibits the company from entering agreements that assume or assign liability contrary to the parameters in the tariff.	Form agreements include language attempting to limit liability to the company when, in fact, the agreements expose the company to *greater* liability.

Q. What is Mr. Jenkins response to OPC's objections regarding single tariff pricing and lead service line replacement?

A. Mr. Jenkins states:

> OPC witness Marke's conclusory statement regarding privatization is nonsensical. It is hard to understand how an investment made for safety reasons—to mitigate the potential increased risk of lead contamination following physical disturbances related to infrastructure work in the area—leads to a complete privatization of water services in the state of Missouri.[14]

Q. Does OPC have a response?

A. Yes. There are <u>many</u> troubling points with Mr. Jenkins statement. To be clear, MAWC is not proposing to replace lead service lines in areas that experience "physical disturbances related to infrastructure work in the area." The Company's plan is to replace full lead service lines in conjunction with planned main replacement on an as needed basis. Nothing more than this has been put forward.

There are no plans to retroactively replace lead service lines that have been historically passed over for the past ten years in St. Louis County during ISRS replacement. There are no plans to replace lead service lines in conjunction with municipal work related to road or other infrastructure repair. There are no plans to target at-risk homes, let alone to inform customers what exactly their plan is. There are many unanswered questions and many potential liabilities now on the line. As it stands, OPC has literally no idea how much money the Company is expected to spend on lead service line replacement activity in what is

[14] Rebuttal Testimony of James M. Jenkins, p. 21, 19-23 and p. 22, 1-3.

supposed to be an open and transparent discovery to support its future test year proposal. How is this even possible?

To date, the entirety of MAWC's future proposal regarding lead service line replacement consists of a single concluding sentence by Mr. Jenkins in his rebuttal testimony:

> Finally, Company witness Aiton will address the Company's LSLR program, including its scope, **in his surrebuttal testimony in this case**.[15] (emphasis added)

Again and again, the Company has failed to produce anything to substantiate its proposal. Not surprisingly, OPC and other parties will now be denied the opportunity to reply to anything the Company may (or may not) introduce in surrebuttal testimony.

Q. Please continue.

A. A point needs to be emphasized about the uncertainty around this practice as it relates to safety. First, we are all operating with incomplete knowledge. This was perhaps illustrated best by Staff witness Mr. Merciel on-the-record response to OPC in Case No. WU-2017-0296:

> RECROSS EXAMINATION
>
> By Mr. Opitz:
>
> Q. Mr. Merciel, you were discussing, I guess rescaling occurring in the pipes—
>
> A. Yes
>
> Q. --with the Chairman. What is the basis for your estimate of weeks or months for a pipe to rescale?
>
> A. **I have to admit it's a wild guess.** (emphasis added)
>
> Q. Okay.
>
> A. I don't know. I've never—I've never looked at it. Scaling does occur.
>
> Q. Okay.

[15] Ibid. p. 22, 3-4.

A. I don't know how long it takes a water—somebody better with water chemistry would have to answer that.

Q. Can you tell me what kind of disturbance would be required for the scale to break off?

A. Well, any time there's any vibration—I don't know. I don't know how to describe it. Shaking, moving of the pipe. **The example we have, you can see where that pipe was cut with a saw, and—and that—that broke some scaling off.**

I saw a news article, it was from New Orleans, City of New Orleans was doing some street work, and they also own their water system, municipal water system. And the City was informing customers that doing street work could be causing vibrations if they had lead service lines or it cause could cause them some problems.

They weren't offering to replace it or anything like that. It was just notifying customers that there could be issues with lead pipes. Just one of the bits of information that I saw and reviewed all the stuff.

Q. Since you mentioned the street disturbance, is city of Jefferson City served by Missouri-American?

A. Yes, it is.

Q. And have you noticed any, I guess, construction going on around town here?

A. Well, I'm going to—I'm going to say yes. I think every City has projects going on from time to time.

Q. And do you know if the company is notifying customers around those construction projects, whether it's—it's got—they have lead service lines?

A. To my knowledge, they're not.

Q. Okay, Thank you.

A. I could be wrong, but not to my knowledge.[16]

[16] WU-2017-0296. Evidentiary hearing- Volume II 9/27/2017 P. 249, 3-25, p. 250, 1-25 and p 251, 1-6.

Q. Why did you emphasize Mr. Merciel's example of the pipe that was sawed off?

A. Because it is one of the issues OPC raised and put forward as pertinent research that needed to be examined focused on the removal of the lead service line. Simply put, if a contractor were to saw a lead service line there would clearly be scaling/lead breakage. Other excavation methods would no doubt produce different results (e.g., a pipe cutter). These are important questions to ask not only about the historical studies the parties appear to be relying on, but also the proper implementation procedures moving forward.

Q. Has American Water conducted research on this topic?

A. Yes. In WU-2017-0296, OPC sent the following data request and received the following response:

> **Information Requested**:
>
> Reference direct testimony of Naumick p. 13, lines 13-16 wherein the witness states "[o]ur processes were further refined following data verification and evaluation of an intensive monitoring program during replacement work performed by American Water subsidiaries in New Jersey and Illinois." Explain how the "process" occurred before the update and describe the changes to the "process" (including the date the new "process" was implemented).
>
> **Information Provided**:
>
> The following describes key steps in developing the process for full lead service line replacement.
>
> - In the spring of 2016, American Water Works Service Company ("Service Company") began a review process of the approach to mitigating lead in drinking water.
> - Service Company issued flushing guidance to the state operating companies in April 2016 for use whenever a lead service line or lead gooseneck was encountered during construction.
> - The scope for pilot assessment work was developed in the summer of 2016.
> - One system in New Jersey and one system in Illinois were identified to confirm the practicality of deploying the recommended protocol and to identify gaps, if any, in the protocol.
> - The local operations in these two service areas then identified customers to participate in the pilot assessment work

- During the fall of 2016, the company worked with the identified customers to educate them about the lead service line replacement process, schedule the work, and engage them in the flushing and sampling steps.
- Targeted lead service line replacements and associated sampling continued through early 2017.
- An access agreement template was developed for the affiliated utility companies for their use to facilitate working on customer property. Each affiliated company then refined the template as needed per their state legal requirements.
- Additional customer communication materials are being rolled out in 2017 with Spanish translations. (i.e., door hangers to remind the customer to return their water samples, scripts for calling customers prior to the start of work, and similar)

After the assessment, improved the protocol, tested our assumptions about how to organize the work, and verified that the flushing protocol was protective. The following outcomes were also achieved:

- Gained a better understanding of the advanced planning needed to identify if the customer owned portion of service line is lead, contact the customer, explain the process, and answer their questions.
- Gained a better understanding of how local officials would like to be kept informed of this work
- Developed targeted “Frequently Asked Questions” to be included in our program materials for customers
- Achieved a sense for the ease or difficulty of performing the flushing protocol (customer performed vs. need to have a plumber perform)
- Achieved a sense of the ease or difficulty in removing and cleaning faucet aerators
- Gained a better understanding of the customer’s willingness to take water samples.
- Gained a better understanding of how to engage the customer in managing their household plumbing after the lead service line was replaced.
- Identified and established guidance for dealing with potential issues when replacing the full service line rather than just the portion from the main to the curbstop, such as how to deal with premise electrical system grounding, the need for the customer to be home, the amount of time needed for the work to be completed and similar level of project details.
- Improved understanding of how the contractor can successfully interact with the customer.

On June 28, 2017 OPC received additional supplemental information as follows:

> **Supplemental Information Provided**:
>
> The process changes are included in the 2017 work flow discussed in testimonies from Mr. Naumick and Mr. Aiton. Specifically, the pre-work sample in the 2016 work in NJ and IL was difficult to schedule and provided little value in the analysis of the effectiveness of the flushing. As a result, the pre-work sample was removed from the recommended process. The flushed sample provided value in determining if the flush time and velocity were adequate. Therefore the flush sample was kept in the recommended procedure as described in the Company witnesses' testimony. The still sample was also deemed of value and kept in the recommended process. Other factors encountered during the testing helped to refine the protocol that is discussed in the Company witnesses' testimony. These included how to proceed if aerators cannot be removed, if home treatment units are in place, if drains are too slow and similar logistical issues as well as how best to communicate with the customer through the process.
>
> Responsible Witness: Gary Naumick[17]

OPC was given no written records or reports of American Water's research results of its New Jersey or Illinois studies. Phone conversations with Company representative Mr. Brian LaGrand confirmed that no records existed but that the Company's lead scientist, Dr. Mark LeChevallier[18] could be made available to discuss the results over the phone with OPC.

On June 30, 2017 at approximately 12:30 pm I had a conference call with Mr. LaGrand and Dr. LeChevallier (Mr. Naumick was unable to make the telephone call but was cc'd within the email).[19]

[17] See GM-2.
[18] American Water (2018) Mark W. LeChevallier, Ph.D https://amwater.com/corp/drwater
[19] See GM-3.

Q. What did Dr. LeChevallier say about American Water's research on the topic of partial and full lead service line replacement?

A. He told me that their research was unable to determine any difference; that their researchers "really wanted" to show something statistically significant, but it just did not happen.

Q. Why is OPC just now bringing this revelation to the Commission's attention?

A. In retrospect, OPC should have put this information out in the WU-2017-0296 case. Naively, OPC believed that MAWC would eventually put forward someone from its Research and Technology program to substantiate the Company's proposal.[20] This, turned out to be an incorrect assumption.

Q. What should the Commission note from this information?

A. That the Company has confirmed from its own research that this practice may not be warranted. Even with that information, OPC has elected to put forward a pilot study to further explore this policy decision and to make sure that as many reasonable known secondary and tertiary unintended consequences could be mitigated.

OPC is at loss as to why parties to this case are seemingly comfortable with the heightened risk and uncertainty we have identified given the large impact such a proposal would have on customers' rates. Our fear is that parties are sincerely motivated by altruistic acts, but are far more likely to inflict objectively foreseeable and unreasonable harm to the very population they are intending to help.[21]

As it stands, OPC continues to await what the Company's proposal and plan will be, presumably, when they file it in surrebuttal testimony.

[20] American Water (2018) Research & Technology https://amwater.com/corp/water-quality-wastewater-service/research-technology

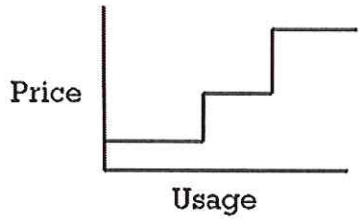
[21] See also Oakley, B.A. (2013) Concepts and implications of altruism bias and pathological altruism. Proceedings of *the National Academy of Sciences*, 110 (Supplement 2, 10408-10415. http://www.pnas.org/content/pnas/early/2013/06/04/1302547110.full.pdf or GM-4.

Q. Does this conclude your testimony?

A. Yes.

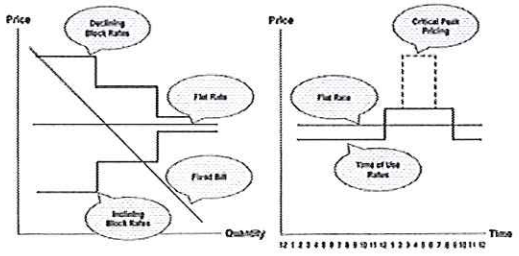
Rate Design:

Residential Electric Inclining Block Rates

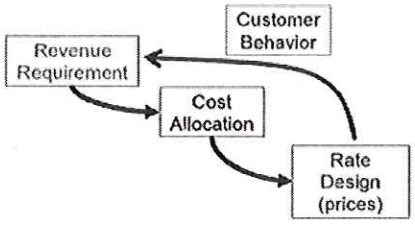


Geoff Marke, Economist
Missouri Office of the Public Counsel

Pricing influences usage



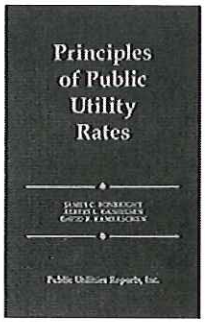
The Feedback Loop



Determine Rate Design Goals

Bonbright Principles

- Efficiency
- Simplicity
- Continuity
- Equity
- Stability



More art than science

- Tradeoffs between principles
- Different conditions between utilities
- Different interpretations of the principles
- Competing policy and/or mandates

- **Positive statements**

  are objective statements that can be tested, amended or rejected by referring to the available evidence.

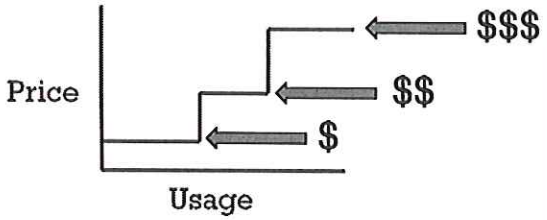
- **Normative Statements**

  expresses a value judgment about whether a situation is desirable or undesirable. It looks at the world as it "should" be.

What is an Inclining Block Rate?

Inclining Block Rates

- The more you use, the more expensive it gets



What does the literature say?

High usage = bigger price elasticity

- As prices increase, less quantity is demanded

TABLE 1	DISTRIBUTION OF RESIDENTIAL PRICE ELASTICITIES			
		Low	Most Likely	High
Short Run	Block 1	-0.01	-0.13	-0.20
	Block 2	0.02	-0.26	-0.39
Long Run	Block 1	-0.03	-0.39	-0.60
	Block 2	-0.06	-0.78	-1.17

Faruqui, A. (2008) Inclining Toward Efficiency. The Brattle Group
https://www.fortnightly.com/fortnightly/2008/08/inclining-toward-efficiency

Kansas Corporation Commission Study

Table 5.1: Percentage Changes in Usage by Season and Utility, *SFV*

Utility	Summer	Winter
KCP&L	+3.0%	+1.1%
Westar	+6.8%	+2.6%
Midwest	+4.6%	+2.6%

Straight-Fixed Variable Rate Design Increases Consumption

Table 5.2: Percentage Changes in Usage by Season and Utility, *IBR*

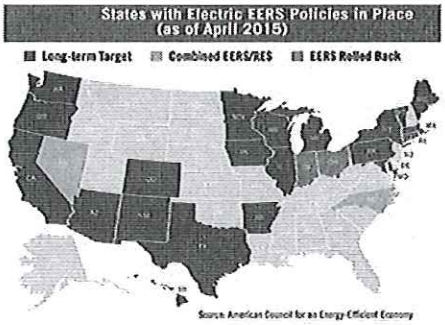
Utility	Summer	Winter
KCP&L	-2.3%	-3.4%
Westar	-0.3%	-3.7%
Midwest	-2.8%	-3.9%

Inclining Block Rate Design Decreases Consumption

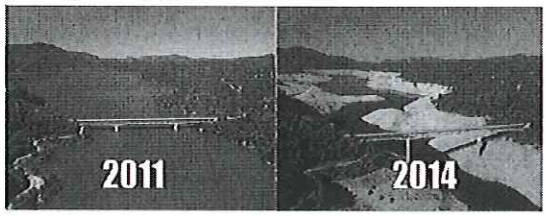
Hansen, D.G. and Michael O Sheasy (2012) Residential Rate Study for Kansas Corporation Commission Final Report.
http://www.kcc.state.ks.us/electric/residential_rate_study_final_20120411.pdf

Policy Rationale
Supporting
Inclining Block Rates

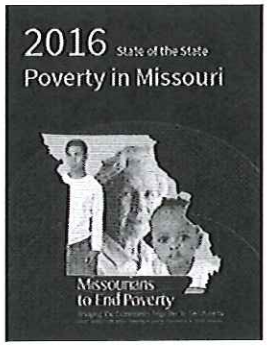
Promote conservation & meet mandates



Resource Crisis



Lifeline Rates



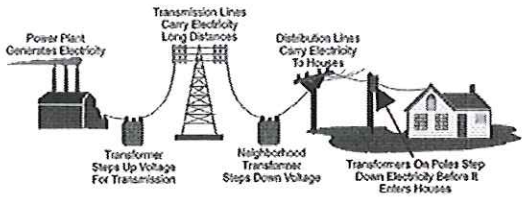
Lifeline Rates Cont…

Figure 2: Characteristics of above-average and below-average Empire residential ratepayers[11]

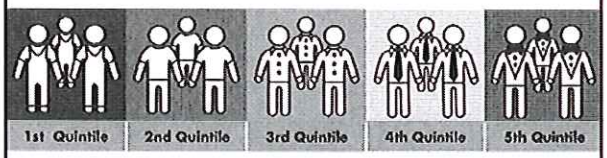
Who uses more energy on average?	Who uses less energy on average?
Homeowners	Renters
Homes with 3+ people living in them	Homes with 1 person living in them
Single-family homes and mobile homes	Multi-family apartments with 5+ units
Homes with more than 3,000 square feet	Homes with less than 1,000 square feet
Homes built 2000-2009 (pre-tornado)	House built prior to 1970
High-income earning homes ($75K+)	Low-income earning homes (<$35K)

Long-run or social marginal costs

- In the long run, all costs are variable



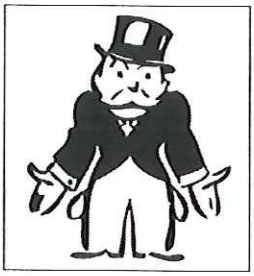
More "equitable" than energy efficiency?



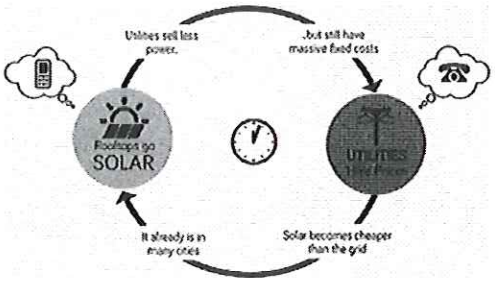
Policy Rationale Against Inclining Block Rates

Revenue Instability

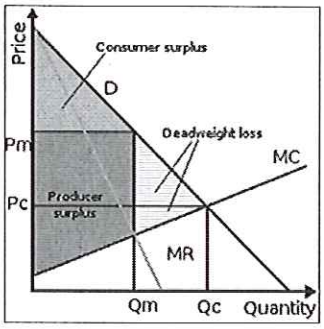
- Natural Monopolies = large fixed costs



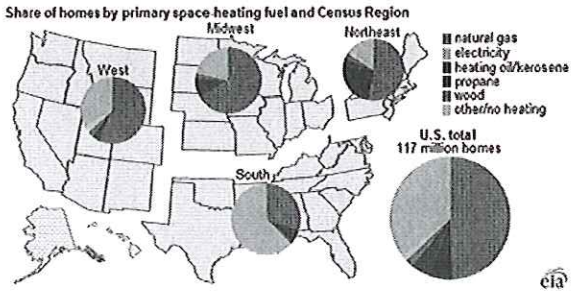
Grid Defection



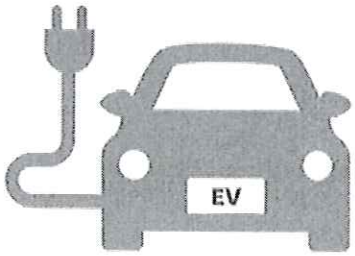
Deadweight Loss



Space Heating



Special Rates



Special rates

Summary

Policy Arguments For:

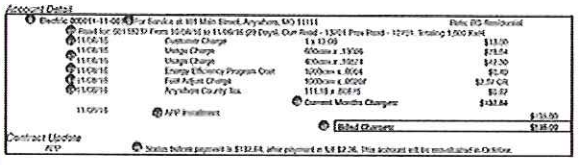
- Promote conservation and meet mandates
- Resource crisis
- Lifeline rates
  - Low usage, low income
  - Multi-family
- Long-term or social marginal costs
- More equitable than energy efficiency

Policy Arguments Against:

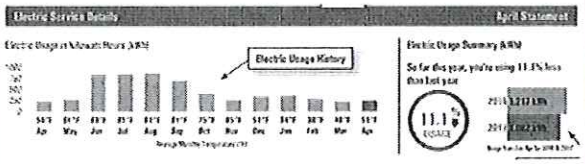
- Revenue Instability
- Deadweight loss
- Grid Defection
- Space Heating
- Special rates
  - (e.g., electric vehicles, medical baseline etc…)

Final Thoughts

Do ratepayers understand this?



Do ratepayers understand this?



Research suggests that

- "In reality, consumers make such decisions with limited information, attention and cognitive abilities."
- "It is quite clear from studies of cellphone pricing and marginal income taxes that consumer understanding of non-linear price schedules varies widely…

- Such understanding seems amenable to education campaigns, though such approaches will still run up against attention and cognition constraints that are likely significant for the vast majority of consumers who don't think like economists, and even for many who do."

Borenstein, S. (2009) To what electricity price do consumers respond? Residential demand electricity under increasing-block pricing. *Energy Institute at Haas.*
http://faculty.haas.berkeley.edu/borenste/download/NBER_SI_2009.pdf

And

- "Given the information available to most residential electricity customers in my sample period, the information cost of understanding the marginal price of electricity is likely to be substantial."

Ito, Koichiro (2012) Do Consumers Respond to Marginal or Average Price? Evidence from Nonlinear Electricity Pricing. *Energy Institute at Haas.*
https://ei.haas.berkeley.edu/research/papers/WP210.pdf

Recommendations

- Display the rate structure on the consumer's bill in a way that conveys the cost (savings) from increased (decreased) usage.
- Do not raise the (fixed) residential customer charge.

Questions

Geoff Marke, Economist
Missouri Office of the Public Counsel
Geoff.marke@ded.mo.gov
573-751-5563

DATA INFORMATION REQUEST
Missouri-American Water Company
WU-2017-0296

Requested From: Tim Luft
Date Requested: 8/2/17

Information Requested:

Reference direct testimony of Naumick p. 13, lines 13-16 wherein the witness states "[o]ur processes were further refined following data verification and evaluation of an intensive monitoring program during replacement work performed by American Water subsidiaries in New Jersey and Illinois." Explain how the "process" occurred before the update and describe the changes to the "process" (including the date the new "process" was implemented).

Requested By: Timothy Opitz – Office of Public Counsel – timothy.opitz@ded.mo.gov

Information Provided:

The following describes key steps in developing the process for full lead service line replacement.

- In the spring of 2016, American Water Works Service Company ("Service Company") began a review process of the approach to mitigating lead in drinking water.
- Service Company issued flushing guidance to the state operating companies in April 2016 for use whenever a lead service line or lead gooseneck was encountered during construction.
- The scope for pilot assessment work was developed in the summer of 2016.
- One system in New Jersey and one system in Illinois were identified to confirm the practicality of deploying the recommended protocol and to identify gaps, if any, in the protocol.
- The local operations in these two service areas then identified customers to participate in the pilot assessment work
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- Additional customer communication materials are being rolled out in 2017 with Spanish translations. (i.e., door hangers to remind the customer to return their water samples, scripts for calling customers prior to the start of work, and similar)

After the assessment, improved the protocol, tested our assumptions about how to organize the work, and verified that the flushing protocol was protective. The following outcomes were also achieved:

- Gained a better understanding of the advanced planning needed to identify if the customer owned portion of service line is lead, contact the customer, explain the process, and answer their questions.
- Gained a better understanding of how local officials would like to be kept informed of this work
- Developed targeted "Frequently Asked Questions" to be included in our program materials for customers
- Achieved a sense for the ease or difficulty of performing the flushing protocol (customer performed vs. need to have a plumber perform)
- Achieved a sense of the ease or difficulty in removing and cleaning faucet aerators
- Gained a better understanding of the customer's willingness to take water samples.
- Gained a better understanding of how to engage the customer in managing their household plumbing after the lead service line was replaced.
- Identified and established guidance for dealing with potential issues when replacing the full service line rather than just the portion from the main to the curbstop, such as how to deal with premise electrical system grounding, the need for the customer to be home, the amount of time needed for the work to be completed and similar level of project details.
- Improved understanding of how the contractor can successfully interact with the customer.

Supplemental Information Provided:

The process changes are included in the 2017 work flow discussed in testimonies from Mr. Naumick and Mr. Aiton. Specifically, the pre-work sample in the 2016 work in NJ and IL was difficult to schedule and provided little value in the analysis of the effectiveness of the flushing. As a result, the pre-work sample was removed from the recommended process. The flushed sample provided value in determining if the flush time and velocity were adequate. Therefore the flush sample was kept in the recommended procedure as described in the Company witnesses' testimony. The still sample was also deemed of value and kept in the recommended process. Other factors encountered during the testing helped to refine the protocol that is discussed in the Company witnesses' testimony. These included how to proceed if aerators can not be removed, if home treatment units are in place, if drains are too slow and similar logisitical issues as well as how best to communicate with the customer through the process.

Responsible Witness: Gary Naumick

Marke, Geoff

From: Brian W. Lagrand <Brian.LaGrand@amwater.com>
Sent: Tuesday, June 20, 2017 12:17 PM
To: Marke, Geoff; Mark Lechevallier
Cc: Gary A. Naumick
Subject: RE: Lead Testing Results

Sounds good - call in number is on the invite.

Brian LaGrand
Director of Rates & Regulatory Support
Missouri American Water
727 Craig Road | St. Louis, MO, 63141
O: 314-996-2357 | M: 314-740-9384
brian.lagrand@amwater.com

-----Original Message-----
From: Marke, Geoff [mailto:geoff.marke@ded.mo.gov]
Sent: Tuesday, June 20, 2017 12:03 PM
To: Mark Lechevallier <Mark.Lechevallier@amwater.com>; Brian W. Lagrand <Brian.LaGrand@amwater.com>
Cc: Gary A. Naumick <Gary.Naumick@amwater.com>
Subject: RE: Lead Testing Results

EXTERNAL EMAIL - "Think before you click!"

That works. I'll call in about 30 minutes.

-----Original Message-----
From: Mark Lechevallier [mailto:Mark.Lechevallier@amwater.com]
Sent: Tuesday, June 20, 2017 12:00 PM
To: Brian W. Lagrand
Cc: Marke, Geoff; Gary A. Naumick
Subject: Re: Lead Testing Results

We probably don't need a web link and could just talk by phone. That would be preferred.

Sent from my iPhone

> On Jun 20, 2017, at 12:57 PM, Brian W. Lagrand <Brian.LaGrand@amwater.com> wrote:
>
> Here's a Skype link – I was unable to get a webex, so if this doesn't work for Geoff, we may need to reschedule.
>
> BWL
>
> .....
> --> Join Skype Meeting<https://meet.lync.com/amwater/brian.lagrand/MMD5H2B1>
> Trouble Joining? Try Skype Web App<https://meet.lync.com/amwater/brian.lagrand/MMD5H2B1?sl=1>
>
>
> Help<http://go.microsoft.com/fwlink/?LinkId=389737>
>
> [!OC([1033])!]
> .....
> <meeting.ics>

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GM-3
1/2

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Concepts and implications of altruism bias and pathological altruism

Barbara A. Oakley[1]

Department of Industrial and Systems Engineering, Oakland University, Rochester, MI 48309

Edited by John C. Avise, University of California, Irvine, CA, and approved April 9, 2013 (received for review February 14, 2013)

The profound benefits of altruism in modern society are self-evident. However, the potential hurtful aspects of altruism have gone largely unrecognized in scientific inquiry. This is despite the fact that virtually all forms of altruism are associated with tradeoffs—some of enormous importance and sensitivity—and notwithstanding that examples of pathologies of altruism abound. Presented here are the mechanistic bases and potential ramifications of pathological altruism, that is, altruism in which attempts to promote the welfare of others instead result in unanticipated harm. A basic conceptual approach toward the quantification of altruism bias is presented. Guardian systems and their over arching importance in the evolution of cooperation are also discussed. Concepts of pathological altruism, altruism bias, and guardian systems may help open many new, potentially useful lines of inquiry and provide a framework to begin moving toward a more mature, scientifically informed understanding of altruism and cooperative behavior.

cooperation | empathy | codependency | narcissism | philanthropy

> Reality must take precedence over public relations, for nature cannot be fooled.
>
> —Richard Feynman

Our eyes can be powerless against visual illusions, with our underlying neural machinery leading us to predictably erroneous conclusions about the size or shape of an object (1). In a similar fashion, our empathic feelings for others, coupled with a desire to be liked, parochial feelings for our in-group, emotional contagion, motivated reasoning, selective exposure, confirmation bias, discounting, allegiance bias, the *Einstellung* ("set") effect, and even an egocentric belief that we know what is best for others, can lead us into powerful and often irrational illusions of helping (2). In other words, people's own good intentions, coupled with a variety of cognitive biases, can sometimes blind them to the deleterious consequences of their actions. This dynamic of pathological altruism involves subjectively prosocial acts that are objectively antisocial. (Naturally, there are many objective perspectives. One seemingly objective observer's verdict of antisocial terrorism can be another's verdict of prosocial altruism, with the words "objective," "antisocial," "prosocial," "terrorism," and even "altruism" itself varying in meaning depending on the perspective of the putatively objective observer.)

At the core of pathological altruism are actions or reactions based on incomplete access to, or inability to process, the wide range of information necessary to make prudent decisions that align with cultural values associated with altruistic behavior. Various psychological, religious, philosophical, biological, or ideological biases could lead a person or group to misinterpret, selectively discount, or overly emphasize certain aspects of relevant information. Thus, pathologically altruistic behavior can emerge from a mix of accidental, subconscious, or deliberate causes. ["Altruism," in the context of this paper, is used to signify well-meaning behavior intended to promote the welfare of another; thus altruistic behavior may be motivated by concern for the other, egoistic concerns for the self, or both (e.g., "it makes me feel good to help them") (3). "Pathological" is used in the sense of being excessive or abnormal, without implying any clinical diagnosis.]

Pathological altruism can be conceived as behavior in which attempts to promote the welfare of another, or others, results instead in harm that an external observer would conclude was reasonably foreseeable. More precisely, this paper defines pathological altruism as an observable behavior or personal tendency in which the explicit or implicit subjective motivation is intentionally to promote the welfare of another, but instead of overall beneficial outcomes the altruism instead has unreasonable (from the relative perspective of an outside observer) negative consequences to the other or even to the self. This definition does not suggest that there are absolutes but instead suggests that, within a particular context, pathological altruism is the situation in which intended outcomes and actual outcomes (within the framework of how the relative values of "negative" and "positive" are conceptualized), do not mesh.

A working definition of a pathological altruist then might be a person who sincerely engages in what he or she intends to be altruistic acts but who (in a fashion that can be reasonably anticipated) harms the very person or group he or she is trying to help; or a person who, in the course of helping one person or group, inflicts reasonably foreseeable harm to others beyond the person or group being helped; or a person who in reasonably anticipatory way becomes a victim of his or her own altruistic actions (2). The attempted altruism, in other words, results in objectively foreseeable and unreasonable harm to the self, to the target of the altruism, or to others beyond the target. Examples at an interpersonal level include the codependent wife murdered by the husband she has refused to leave, or the overly attentive "helicopter" father who threatens to sue instructors that give well-deserved bad grades, or the mother who attempts to protect her son by refusing to vaccinate him and who consequently fuels a loss of herd immunity underpinning a local whooping cough epidemic in which an infant dies. Very different personalities can become entangled in pathologies of altruism, ranging from the sensitive hyperempath, to the normal person, to the utterly self-absorbed narcissist. These differing personalities share genuinely good intentions that play out in detrimental ways.

Sometimes there is a blurry line as to whether a problematic outcome for an altruistic action is reasonably foreseeable. This ambiguity can make it difficult to distinguish between altruism and pathological altruism. For example, let's say that, while altruistically helping a friend move to another apartment, you accidentally dropped and broke an expensive statue. Were your actions pathologically altruistic? In the conceptions of pathological altruism outlined here, no. Your altruism would not have been pathologically altruistic, because the bad outcome—the

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dropped statue—arose as a very unlikely and difficult-to-predict outcome of your good intentions. In a different scenario, however, let's say your brother becomes addicted to painkillers. When he goes through withdrawal, you get more painkillers to help him feel better, and you cover for him when his work supervisor calls. You genuinely want to help your brother, but the reality is that you are enabling his addiction. In this case, your well-meaning altruism is pathological.

These examples help clarify the concept of pathological altruism, but similar situations could be more ambiguous. What if you had dropped your friend's expensive statue after you had consumed a bottle of wine? Or what if your painkiller-addicted brother was waiting to be enrolled in a treatment program? We yearn for the definitive in conceptual definitions, but the reality is that there always will be a residual uncertainty.

Motives are also important. Well-meaning intentions can lead either to altruism or to pathological altruism. Self-servingly malevolent intentions, on the other hand, often have little or nothing to do with altruism, even though such malevolence can easily be cloaked with pretensions of altruism. A con artist soliciting for a "charity" that he uses to personally enrich himself would not be a pathological altruist.

Both altruism and empathy have rightly received an extraordinary amount of research attention. This focus has permitted better characterization of these qualities and how they might have evolved. However, it has also served to reify their value without realistic consideration about when those qualities contain the potential for significant harm.

Part of the reason that pathologies of altruism have not been studied extensively or integrated into the public discourse appears to be fear that such knowledge might be used to discount the importance of altruism. Indeed, there has been a long history in science of avoiding paradigm-shifting approaches, such as Darwinian evolution and acknowledgment of the influence of biological factors on personality, arising in part from fears that such knowledge somehow would diminish human altruistic motivations. Such fears always have proven unfounded. However, these doubts have minimized scientists' ability to see the widespread, vitally important nature of pathologies of altruism. As psychologist Jonathan Haidt notes, "Morality binds and blinds" (4).

Relevant here are the remarks of historian of science Thomas Kuhn, who observed that when a paradigm shift occurs, scientists see data for the first time (5). Such is the case with pathologies of altruism, which are not the commonly supposed rare aberrations, "but rather a behavior that overwhelmingly occurs in human social intercourse" (6). It therefore is realistic to encourage exploration of a new, scientifically based paradigm acknowledging that, even given differing semantic parsings, subjectively altruistic feelings sometimes can be objectively problematic and even ultimately antisocial.

The bottom line is that the heartfelt, emotional basis of our good intentions can mislead us about what is truly helpful for others. Altruistic intentions must be run through the sieve of rational analysis; all too often, the best long-term action to help others, at both personal and public scales, is not immediately or intuitively obvious, not what temporarily makes us feel good, and not what is being promoted by other individuals, with their own potentially self-serving interests. Indeed, truly altruistic actions may sometimes appear cruel or harmful, the equivalent of saying "no" to the student who demands a higher grade or to the addict who needs another hit. However, the social consequences of appearing cruel in a culture that places high value on kindness, empathy, and altruism can lead us to misplaced "helpful" behavior and result in self-deception regarding the consequences of our actions (7, 8).

Pathological altruism can operate not only at the individual level but in many different aspects and levels of society, and between societies. Recognizing that feelings of altruism do not necessarily constitute objective altruism provides a new way of framing and understanding altruism. This previously unrecognized perspective in turn may open many new, potentially useful lines of inquiry and provide a framework to begin moving toward a more mature, scientifically informed understanding of altruism and cooperative behavior. The thesis of pathological altruism emphasizes the value of true altruism, self-sacrifice, and other forms of prosociality in human life. At the same time, it acknowledges the potential harm from cognitive blindness that arises whenever groups treat a concept as sacred (4).

The public as a whole would benefit from knowledge that what might feel subjectively altruistic may have negative unintended consequences that both worsen the situation that was meant to be improved and impact other areas negatively. Even the government can work more efficiently when voters and legislators realize that attempts to help others come with very real costs and can have tradeoffs that worsen the very concerns that were meant to be alleviated.

Along these lines, then, this paper suggests that pathologies of altruism and of empathic caring should receive concentrated research focus. Specific recommendations are outlined as well. As an underlying motivation, we should remember that in the nineteenth and twentieth centuries, there was an unparalleled improvement in public health as the entire discipline of medicine came under scientific scrutiny. Medical therapies that at one time were thought to be "obviously" beneficial, such as bloodletting and blistering, were finally subjected to review that found them wanting. In a similar vein, if we are truly to help others, this new century at last forms the time for scientists to subject altruistic modern social engineering and activism efforts, as well as academic disciplines that hinge on "helping," and finally, altruism itself, to far more disciplined scientific scrutiny. It is time for dispassionate exploration of how altruism and empathy themselves can inadvertently bias our efforts to create truly cooperative modern, complex societies.

Evolutionary Considerations

In one sense, pathological altruism can be thought of as a pattern of nurturing or beneficial behavior with evolutionarily unsuccessful consequences. Evidence for antecedents of such behavior can be seen in the animal world; examples include the unwitting hosts of brood-parasitism, as with the wood thrush who devotes substantial resources to raising the offspring of cowbirds. Such antecedent behavior is manifest at even a genetic and molecular level. For example, beneficial replication processes within a cell can be co-opted by viruses (9). Consequent cell lysis or exocytosis allows the new viral bodies to spread the contagion.

Molecular perspectives, in fact, can inform how we perceive altruism and cooperative behavior. A stable molecular bond has the property that the bound state is a lower-energy configuration than the unbound state. A physical system tends toward the configuration that minimizes potential energy. Such "cooperative" behavior often needs an initial activation energy—that is, it comes at cost—but the resulting state resides more naturally and easily at the lower energy level for the newly formed single, integrated, cooperating entity. (This entity may or may not have replicative abilities.)

In these situations, pathological altruism or its antecedents might be thought of as arising in two ways. First, it can arise when other entities—systems that are not, or are no longer, integrated into the first cooperating entity—are able to tap into the lowered energy states and possible replicative abilities produced by the first cooperating entity. Tapping into those lowered energy states may weaken or destroy the first entity. (Initially, such secondary entities may be part of the first entity even as they begin their dissociation, as with precancerous cells. It also is worth noting that cooperative "entities" may be composed of different species, as with wrasses that swim with impunity into the mouths of groupers to feed off parasites, or with human intestinal flora.)

Second, pathological altruism or its antecedents can arise when the lowered energy state of the first system allows the system to

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grow to such a size that it increases the potential for disintegration or destruction from noncooperative mechanisms affiliated with the entity. An example can be found in nuclear fission, where longer-range electrostatic repulsion between protons overcomes the attractive, albeit short-range, nuclear force between nucleons. In more complex cellular processes, the surface area-to-volume ratio limits the cell size. Doubling the size of the cell, for example, requires eight times more nutrients and would have eight times more waste, even though the surface area increased only by a factor of four.

We see these same cooperative versus noncooperative balances playing out on a larger, social scale. For example, the Amazonian Yąnomamö villagers preferred to live in small villages of around 40 people, which seemed to provide an optimal reduction in energy costs affiliated with daily needs for food and safety versus internal strife. However, villages of larger size provided more safety against other, potentially hostile villages. In other words, larger villages could, in some environments, be better at minimizing overall energy costs. Thus, some villages grew to more than 100 inhabitants in size. However, internal repulsive forces increased in the form of disputes that arose as the number of inhabitants in a village increased. Larger villages eventually fissioned, thus beginning the process anew (10). At a much higher level of social complexity, there was an initial economic boom as the European Union was first established. This boom has become tempered as internal nominally altruistic and cooperative efforts—the type of efforts that work fairly effectively in less complex social systems—are ultimately proving disputatious and disruptive.

As entities move to higher levels of complexity, the yin and yang of lowered energy states resulting from cooperation, versus noncooperative internal and external forces and effects, can cause boom-and-bust behavior on evolutionary timescales. How entities resolve these issues of cooperation versus noncooperation is a factor in determining whether entities self-destruct, proceed through cycles of growth versus decline, or are able to move successfully to still higher levels of complexity. Whenever higher levels of complexity are achieved, new issues of cooperation versus noncooperation develop, and the cycle begins anew.

One issue is clear. As entities become more complex, they generally develop evolving "guardian" type feedback mechanisms that allow not only the detection and mitigation of the effects of noncooperative mechanisms ("defectors") but also adaptation to changes in those noncooperative mechanisms. Without such flexible guardian systems, entities fall prey to other entities or to their own inherent noncooperative features. On a cellular level, we see that guardian immune systems have evolved from the rudimentary enzyme systems of unicellular organisms, which protect against bacteriophage infections, to the extraordinarily sophisticated immunological defense mechanisms seen in vertebrates.

Similarly, social systems of cooperative behavior must devise effective immunological guardian functions against efforts to siphon away the energetic advantages of cooperative behavior. Such immune guardian functions also must serve to mitigate disruptive internal forces and effects. (Of course, on a biological level, we see from the many varieties of autoimmune disease that immune-type guardian systems, even when designed with care, can create their own host of difficulties and can be hijacked by noncooperative elements, as with leishmaniasis or AIDS. Similar issues would appear to hold true for complex social systems.)

Thus, to the five mechanisms that have been posited for the evolution of cooperation—kin selection, direct reciprocity, indirect reciprocity, network reciprocity, and group selection (11)— must be added a sixth, guardian function. For cooperative behavior to continue in complex biological or sociological entities, that is, for entities not to fall prey to ever-present, ever-evolving defectors, some form of evolving active guardian function must be present that detects when debilitating or destructive advantage is being taken of cooperative or altruistic behavior. The guardian system must not only detect but also disable such noncooperative behavior or render the entity immune to the pernicious effects. Without such detection and mitigation mechanisms, we see modeled evolutionary entities that are wiped out by defectors (12).

Virtually all the mechanisms for the evolution of cooperation have some degree of overlap. Direct reciprocity, for example, perforce plays a role in indirect reciprocity. In a similar fashion, guardian functions overlap with the other five evolutionary cooperative mechanisms. Reciprocal strategies,such as tit-for-tat, for example, inherently contain what might be thought of as rudimentary and passive guardian functions: If you defect, I will defect. Differences in guardian function between groups could reinforce group selection mechanisms. Guardian functions also could relate to the reputational effects of indirect reciprocity in enhancing cooperation: I may report anyone who does not support the leader, because my family can suffer if I don't. By separating out guardian functions, which address the potential for support or damage to cooperative processes, vitally important mechanisms can be understood and more carefully modeled. Moreover, counterintuitive findings in complex cooperative social systems, such as the importance of selfish behavior and the tradeoffs of religious and ideological mechanisms in inducing and enforcing cooperation, can be clarified (13, 14). For example, poorly designed guardian functions that do not adequately account for Machiavellian leadership and behavior, might play an important role in the failure of social structures. In another example, strong guardian functions that might protect against some internal threats could simultaneously create stifling rigidity that renders the society less able to cope with other challenges. Over previous decades, medical science has come to appreciate the over arching importance of immune systems (themselves examples of guardian systems) in biology. Similarly, awareness of pathological altruism allows those analyzing the evolution of cooperation to appreciate the importance of the full panoply of guardian systems at the many different levels of complexity.

Implications

Let us step back briefly to explore how pathologies of altruism arise at an individual level. Naturally, the small percentage of toddlers and young children who show little concern for others seem predisposed for antisocial behavior as they mature (15). On the other hand, children who manifest altruistic behavior are generally well-adjusted. However, there is a small group of pathologically altruistic children who rate high on altruistic behavior but low on self-actualizing behavior such as showing pleasure at success or doing something on their own. For such children, a psychological cost can arise even at an early age, as shown by high scores in emotional symptoms, including unhappiness, worries, fear, nervousness, and somatization (16).

As neuroscience and genetics are beginning to elucidate the biological as well as cultural basis of altruistic and empathic behavior, it has become clear that individuals vary in their innate underpinnings involving empathy and altruism (17). Therefore an educational, religious, and societal "one size fits all" approach to enculturation that uniformly affirms the importance of altruistic caring, without a tempered acknowledgment of the tradeoffs, may inadvertently be harmful for some children in the long run. (In other words, social attempts to blindly encourage altruism become themselves a perfect example of pathological altruism.) Without insight into the undesirable effects arising from empathy and altruistic intentions, children and adults with an existing hypersensitivity toward others find it more difficult to detect and react appropriately to manipulation or to situations in which natural feelings of empathy could lead to undesirable outcomes.

Indeed, it seems that caring for others, helpful as it sometimes may be to those receiving or demanding that care, can have pernicious long-term consequences for the care giver, including guilt, burnout, depression, and stress disorders (18, 19). Stress resulting from empathic caring has been shown to produce errors

in medical treatment (20). Feelings of empathic caring also appear to lie at the core of dependent personality disorder, codependent behavior, and even anorexia (2). Caring, empathic, helicopter parents can, with the best of intentions, inflict lasting damage on their children (21).

Empathy is not a uniformly positive attribute. It is associated with emotional contagion; hindsight bias; motivated reasoning; caring only for those we like or who comprise our in-group (parochial altruism); jumping to conclusions; and inappropriate feelings of guilt in noncooperators who refuse to follow orders to hurt others (22–29). Oxytocin, the "goody-goody hormone" that underlies maternal bonding and many aspects of empathy, also increases both envy and gloating (30). Empathy also can be used by the self-serving, including psychopaths, to deduce how to further their own ends (31). Being emotionally close to someone who is selfish or dishonest has been found to lead people to becoming more selfish and dishonest themselves (32). Allegiance bias causes forensic scientists to call their findings for the team they believe has hired them (33). [Indeed, the reliability of all types of forensic science evidence, including ostensibly objective techniques such as DNA typing and fingerprint analysis, has been called to question (34).] Judges, almost all of whom are lawyers, favor the legal system in their decisions; this bias has far-reaching and deleterious effects on American law (35).

Quietly going along with the flow—refusing to blow the whistle on objectively criminal behavior, for example—also sometimes may be a form of pathological altruism that grows from our feelings of empathy. In other words, the altruism and empathy we feel often isn't really about the person or group ostensibly being helped but instead often are about us. Sometimes they relate to the pain we might feel at being ostracized or shunned for thinking or acting differently. Or they relate to building our reputation—we wish to be publicly perceived as being altruistic, whether or not our efforts are truly altruistic, so that we can receive the reputational benefits of indirect reciprocity. (Juries are notoriously magnanimous with other peoples' money.) Some would say that, once egoism is involved, the result is no longer altruism, so there is no such thing as pathological altruism. However, such an interpretation would also mean there is no altruism, because egoistic reward circuitry appears to be an important determinant of altruistic behavior.

As the work of Nobel laureate Daniel Kahneman, Jonathan Haidt, and others has shown, humans possess both intuitive fast and rational slow cognitive processes (4, 36, 37). Intuitions come first; reasoning follows to support that intuition (38, 39). Empathy is driven by fast processes. We often make snap judgments as a result of empathy and superficial notions of altruism [related to the "moral heuristics" described by Sunstein (40)]. Then, as both Kahneman and Haidt have explored in depth, we are experts at justifying emotionally based decisions with back-filled rationality. *Einstellung*, the inability to see another solution once an initial solution is prefixed in mind (41), means that a superficially helpful approach can become reified, further reinforced by motivated reasoning, selective exposure, belief perseverance, and growing overconfidence (42), along with moral heuristics such as those involving omission bias and outrage (40).

However, surprisingly, an individual can be oblivious to the consequences of these interwoven effects as a consequence of "bias blind spot" (43). In this fashion, an initial snap, commonsense judgment about what seems right in helping others can gel quickly into formidable certitude without consideration of important relevant facts. As noted by Mercier and Sperber, "there is considerable evidence that when reasoning is applied to the conclusions of intuitive inference, it tends to rationalize them rather than to correct them ... reasoning pushes people not towards the best decisions but towards decisions that are easier to justify" (42). Intelligence is no safeguard regarding these confirmation bias-related issues. Highly intelligent people, for example, do not reason more even-handedly and thoroughly; they simply are able to present more arguments supporting their own beliefs (44). As Columbia's Mark Lilla has pointed out "Distinguished professors, gifted poets, and influential journalists summoned their talents to convince all who would listen that modern tyrants were liberators and that their unconscionable crimes were noble, when seen in the proper perspective. Whoever takes it upon himself to write an honest intellectual history of twentieth-century Europe will need a strong stomach" (45). In fact, combating extreme confirmation bias has been called one of psychology's most pressing research priorities (46).

Sometimes it is appropriate to turn off or distance oneself from feelings of empathy, and it appears such emotional distancing can be learned (47, 48). In fact, it is clear that turning off empathy—becoming dispassionate—is normal in certain conditions, such as a surgeon performing surgery. Indeed, many hospitals have policies forbidding surgeons from operating on family members, a circumstance in which it would be more difficult to maintain a dispassionate stance.

In psychology, lack of awareness of limitations and tradeoffs regarding empathy has spilled over into the therapeutic process itself. Older therapists remember sayings such as "empathy defeats therapy" (49), but such attitudes have fallen away as psychologists increasingly have placed a premium on empathic care during the therapeutic process. In a related vein, within the field of nursing, the importance of empathy and compassion for patients is emphasized so unrelentingly that it would be reasonable to explore the possibility of a causal relationship between the unilateral focus on caring and the severe issue of burnout among nurses (50). Health care workers are not taught about the potential hazards of excessive or misplaced empathy; consequently, a gradual dehumanization process unfolds (51). An unconditional support of empathy and altruism makes matters so difficult for some members of general society that a counterculture of popular literature and support groups involving codependency has arisen. However, such approaches suffer from a lack of scientific merit or rigor (52).

It is clear that, without the support of science, it is impossible to steer societal mores toward a more nuanced understanding of altruism and empathy that ultimately can benefit everyone.

Extended Implications

There are broader implications related to these issues, particularly regarding the policy aspects of the scientific enterprise. Good government is a foundation of large-scale societies; government programs are designed to minimize a variety of social problems. Although virtually every program has its critics, well-designed programs can be effective in bettering people's lives with few negative tradeoffs. From a scientifically-based perspective, however, some programs are deeply problematic, often as a result of superficial notions on the part of program designers or implementers about what is genuinely beneficial for others, coupled with a lack of accountability for ensuing programmatic failures (53). In these pathologically altruistic enterprises, confirmation bias, discounting, motivated reasoning, and egocentric certitude that our approach is the best—in short, the usual biases that underlie pathologies of altruism—appear to play important roles.

For example, teen pregnancy has received substantive focus in recent years. Teenagers in the United States become pregnant, contract sexually transmitted diseases, and have abortions at much higher rates than teenagers in most other industrialized countries. However, the most effective, scientifically proven approaches to reducing teen pregnancy are often ignored. As psychologist Timothy Wilson noted in summarizing the many problematic efforts in this area: "The fact that policy makers learned so little from past research—at huge human and financial cost—is made even more mind-boggling by being such a familiar story. Too often, policy makers follow common sense instead of scientific data when deciding how to solve social and behavioral problems" (54). Policy-makers and policy-supporters,

in other words, are shaped by cohesive cognitive biases regarding their intentions to help others.

In yet another area, ostensibly well-meaning governmental policy promoted home ownership, a beneficial goal that stabilizes families and communities. The government-sponsored enterprises Freddie Mac and Fannie Mae allowed less-than-qualified individuals to receive housing loans and encouraged more-qualified borrowers to overextend themselves. Typical risk–reward considerations were marginalized because of implicit government support (55). The government used these agencies to promote social goals without acknowledging the risk or cost. When economic conditions faltered, many lost their homes or found themselves with properties worth far less than they originally had paid. Government policy then shifted to the cost of this "altruism" to the public, to pay off the too-big-to-fail banks then holding securitized subprime loans. For those who care about helping the needy in this country, or those who object to corporate bail outs, these trillion-dollar costs bring into high relief the immediate need for scientifically informed planning and evidence-based reevaluation. What is of primary concern here is that altruistic intentions played a critical role in the development and unfolding of the housing bubble in the United States, which in turn had enormous impact on the US economy. This recent history emphasizes the importance of studying not only altruism but also its biases and the consequences of those biases.

In foreign aid, $2 trillion dollars have been provided to Africa over the past 50 years. As chronicled by economist and former World Bank consultant Dambisa Moyo, a native of Zambia, such aid has resulted in measurably worsened outcomes in a broad variety of areas, supporting despotism and increasing corruption and a sense of dependency in Africans (56). In some cases, the money has been directly responsible for extraordinary damage (57, 58). Experienced foreign aid worker Ernesto Sirolli echoes many when he notes that much Western aid arises from narcissistic paternalism and patronization (59). We see here yet another situation where preconceived altruistic notions render it more difficult to focus on and react to indications supplied by data.

Viewing altruistic behavior as a source of both potentially positive and potentially negative influences may provide a framework for understanding better a variety of complex challenges. For example, one of the most important national issues of our time, as outlined in the National Academy Press publication *Choosing the Nation's Fiscal Future*, is the looming federal deficit (60). Ralph Cicerone, President of the National Academy of Sciences, and Jennifer Dorn, President and Chief Executive Officer of the National Academy of Public Administration, jointly wrote: "Much is at stake. If we as a nation do not grapple promptly and wisely with the changes needed to put the federal budget on a sustainable course, all of us will find that the public goals we most value are at risk."

How can such budgetary policies arise and continue? Arguably, their establishment and growth is cultivated by broadly Judeo-Christian cultural values and educational processes related to empathy and altruism. [Cultures can conceptualize empathy, altruism, and associated values in different ways (4, 61).] In this cultural perspective, empathy and altruistic intentions often are viewed as monolithically positive, nearly sacred qualities with negligible tradeoffs, whether or not the empathy is genuinely beneficial or the outcome of the altruistic intentions is truly altruistic. "It's the thought that counts," as the saying goes when discounting negative consequences of altruism.

A supportive bias for claimed altruistic efforts appears to have contributed not only to a plethora of economic woes but also to a continuing record of difficulties in the social sciences, where programs, theories, and therapies with altruistic intent—particularly those which coincide with preconceived "obviously beneficial" notions of helping—do not appear to receive the same careful scientific scrutiny as less obviously well-intentioned programs (54, 62, 63). This lack of critical appraisal has been seen in vitally important areas such as the mitigation of posttraumatic stress disorder, the reduction of family violence, the elimination of racial prejudice, the reduction of sex differences in mathematics, and the lessening of adolescent behavior problems and drug use (64–71). In one example, a therapy called "Critical Incident Stress Debriefing" was broadly implemented throughout the United States to reduce posttraumatic stress disorder, even though this costly program simply did not work and, in fact, sometimes worsened the very stress it was meant to resolve (67).

Well-meaning but unscientific approaches toward altruistic helping can have the unwitting effect of ensuring that the benefits of science and the scientific method are kept away from those most in need of help. In the final analysis, it is clear that when altruistic efforts in science are presented as being beyond reproach, it becomes all too easy to silence rational criticism (62, 70, 72–78). Few wish to run the gauntlet of criticizing poorly conducted, highly subjective "science" which is purported to help, or indeed, of daring to question the basis of problematic scientific paradigms that arise in part from good intentions. Edward O. Wilson ran into just such a well-meaning buzz saw with the publication of his *Sociobiology*, as did Judith Rich Harris with *The Nurture Assumption* and Napoleon Chagnon with his studies of rates of violence among the Amazonian Yąnomamö (10, 79, 80).

To object to a scientific theory is one thing, but to object to a scientific theory that connects however tenuously to feelings of morality is quite another. Once morality plays a role, even at the most subliminal level, the formidable cognitive biases of altruism and its pathologies can swing into play. Perhaps for that reason different academic disciplines and specific topics within those disciplines show differing requirements for rigor. In disciplines related to helping people (which can encompass a surprisingly broad swathe of even hard-science topics), scientists' differing treatment of research findings that elicit altruism bias can skew the findings of seemingly objective science (81). As Robert Trivers has noted: "It seems manifest that the greater the social content of a discipline, especially human, the greater will be the biases due to self-deception and the greater the retardation of the field compared with less social disciplines" (82).

One of the most valuable characteristics of science is that, despite the obvious imperfection of biases in ostensibly objective scientists, it provides a potential mechanism for overcoming those biases. At the same time, altruism bias may be one of the most pernicious, hard-to-eradicate biases in science, because it involves even-handed examination of what groups of seemingly objective rational scientists subliminally have come to regard as sacred. [Biases and belief systems can have a sense of the sacred even when not formalized as religions (4).]

As noted previously, many government programs are indeed beneficial, and some are invaluable in allowing the population as a whole to live meaningful lives supported by a safety net for life's inevitable difficulties. However, the National Academy Press publication *Choosing the Nation's Fiscal Future* documents that the federal deficit is clearly heading for a crisis. In other words, as a result of manifold individual decisions, many of which were based on very real intentions to help others, everyone is at risk for serious harm. Such crises may arise, not as a tragedy of the commons, but rather, as a tragedy of altruism.

In the small social groups which characterized most of human history, altruism bias and pathologies of altruism would have had few means for extending broad influence. In modern times, with the mass outreach potential of a few well-intentioned individuals or influential groups, who often have little or no ultimate accountability for programmatic failures or other detrimental effects, pathologies of altruism can assume enormous importance. It is reasonable to help shift the scientific and cultural paradigm and set the stage so that it becomes culturally acceptable, even expected, that one should attempt to quantify objectively purported claims of altruism. This paradigm shift is particularly important with regards to the budgetary tradeoffs and planning that form important aspects

of effective government that promotes cooperative behavior. The reality is, as made clear in the joint statement by the presidents of the National Academy of Sciences and the National Academy of Public Administration, that unless these types of considerations are made expeditiously, extraordinary cuts must be made in even the most genuinely beneficial programs (60). A voting public encouraged to follow a short-term, superficial, "feel good," emotionally-based heuristic for helping others is a voting public that much more easily can make poor long-term decisions.

Toward a Conceptual Framework

As scientists and engineers know well, "all models are wrong, but some are useful" (83). Embedded in any model is perspective, that is, the framework perceived by the developer. In the past, altruism (or cooperation) generally has been conceived and modeled as lying on a continuum between nonexistent and existent, much like the concept of eusociality (in which the opposite of eusociality is asociality; that is, no tendencies for grouping or socializing at all (84–87). ("Asocial" may also be considered, in some conceptions, to be "selfish" or "egoistic.") More recently, altruism has been conceived on a positive-to-negative continuum where negative altruism involves malevolent intentions, Machiavellianism, and psychopathy (88).

However, altruism can be framed in a third way, as a positive-to-negative continuum where negative altruism is altruism with antithetical consequences, i.e., pathological altruism. Viewing altruism in this way provides insights that relate to both individual personality traits and to large-scale modeling. There are tradeoffs to virtually all forms of altruism, and considering altruism as possessing both positive and negative aspects allows one to take more careful consideration of who is helped (the beneficiary) and who is harmed (the victim). Sometimes the same individual or group may be both helped and harmed. Parochial altruism—the combination of in-group altruism and out-group hostility—is positive altruism within one group but negative altruism for another. High taxes, for example, may be considered as positive altruism for one group and as negative altruism for another.

It should be noted that these conceptions formulate the problem primarily in terms of the altruism provider and stress the liability arising from, among other things, empathy and identification. It also is possible to formulate altruism as a dynamic process controlled in part by the altruism seeker (89). Moreover, the entitlements pressed for by the altruism-seeker may be either objectively helpful (for example, a scholarship sought by a hardworking student) or harmful (for example, alcohol sought by an alcoholic). In other cases, the altruism-seeker may desire seemingly infinitesimal acts of altruism that ultimately play a role in widespread long-term negative outcomes, as seen with grade inflation and social promotion. Jean Twenge and her research group have pointed toward substantive increases in narcissism in the population over the past decades, "Trends in positive self-views are correlated with grade inflation … but are not explained by changes in objective performance" (90, 91). It also may be that the actual help needed by those seeking or expecting help, as with Munchausen by Internet (in which Internet users feign a variety of ills to draw attention), involves something entirely different from what is sought.

Studies suggest that those involved in altruistic transactions benefit differentially from them, and egoism can play surprising roles. For example, sensitive children may have better personal outcomes if they behave egoistically in some instances. However, as shown with Twenge's work, other children appear to have unrealistic expectations when egoistic considerations are encouraged. The question thus arises: When and for whom is egoistic behavior beneficial or harmful? What is the relationship of egoism to altruism and—most importantly for our purposes—to pathologies of altruism? Further, how can we study these issues scientifically without our own judgments and moral righteousness intruding, guiding answers toward what we are certain will be helpful for others to hear rather than toward what the data actually reveal?

We can find clues as to how to proceed by examining prospect theory, where outcomes are assigned differing values depending on whether there are gains or losses. Losses hurt more than "feel good" gains. With altruism bias, it appears that people assign varying values to outcomes based on their underlying moral assessment. An example of such altruism bias was seen in subjects who were given a posthypnotic suggestion to feel a flash of disgust (an intimate part of moral judgment) when hearing a particular arbitrary word. Moral judgment—that sense of whether something is or is not helpful for others—could be made more severe by the presence of the arbitrary word (92). Researchers were surprised to find that even in a control situation where there was no apparent moral issue, the arbitrary words caused some subjects to make more negative moral judgments; later, the subjects confabulated stories to explain their behavior. Many factors have been shown to influence moral judgment at a subconscious level (4).

It appears that when a person attempts rationally (using the "slow" system) to calculate the utility of something that he or she already has judged through "fast" cognitive processes to be morally beneficial, skewed judgments are made, inflating the good outcomes and deflating the bad. Analogously, one can imagine that if malevolence was the goal, as with ill-intentions by a parochial in-group toward an out-group, benefits would be deflated and harms inflated.

A Path Forward

Personal-Scale Studies. Pathologies arising from altruism can be studied on an individual level. For example, many of the errors of judgment cited in the extensive listing in ref. 93 could result in altruism bias, or altruism bias could underlie and help lead to those judgment errors. In this regard, does the brain use a simple underlying "thumbs up" moral heuristic that leads "rational" thought processes to a foregone conclusion, as with the allegiance effect? Can such a heuristic be seen as a characteristic signature in medical imaging? Do individuals vary in their ability to influence their underlying moral heuristics? Are some individuals addicts of their feelings of self-righteousness? What varying effect does culture have on different individual's moral heuristics? On a side note, it appears that altruism bias, like many such biases, is a Jamesian fringe phenomenon of consciousness, much like the feeling of familiarity. It seems to grow from or relate to that little studied sense of rightness, of certitude—a tip-of-the-tongue feeling built on a web of biases, influences, and perceptions that one thing is beneficial, whereas another is not (94–96). Self-righteousness and pathologies of certitude have received almost no research emphasis (94, 95).

Narcissism, one of the most strongly heritable of all personality traits (97), has been similarly neglected. Narcissism is comorbid with many of the most troublesome personality disorders and dysfunctions, including psychopathy, borderline personality disorder, and bipolar disorder. So it comes as a surprise to learn that there are almost no hard-science imaging studies focusing on narcissism, although many other syndromes, as well as the positive aspects of empathy, have received keen research focus (98–100). Narcissism, in other words, deserves priority in imaging research.

Similarly, the vital topic of codependency has received almost no hard-science research focus, leaving "research" to those with limited or no scientific research qualifications (52). An indication of the popular need for and interest in this area is that a single book, *Codependent No More*, has sold more than five million copies over several decades. It is reasonable to wonder if the lack of scientific research involving codependency may relate to the fact that there is a strong academic bias against studying possible negative outcomes of empathy. Codependency, like narcissism, would thus be an important area of research in the elucidation of pathologies of altruism.

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Broad-Scale Studies. At a larger scale, almost any data-driven model or projection in any discipline or government enterprise that even indirectly impacts an area of fairness or morality, or which contains significant potential for disciplinary bias, can be examined to see how well it actually has performed in the context of unfolding real-world data. Unexpected performance of the model or projection could be an indicator of altruism bias, and the bias could be quantified as to when, where, why, how, and to what extent it occurred. For example, a better understanding of altruism bias in data analysis and program development and implementation may provide insights regarding a great variety of phenomena, including the artificially inflated values of economic bubbles or various inadequate statistical measures (for example, those involving unemployment and economic growth) that can falsely boost the effects of well-meaning efforts. Concepts of pathological altruism thus can serve a normative purpose, helping us create better policies. Knowledge of how altruism bias distorts objective scientific inquiry can and should be considered a confounding factor when developing formal models.

It should be noted, however, that those possessing altruism bias would be most strongly biased to object to the very concept of altruism bias (101). Research has shown the near impossibility of reaching biased individuals using rational approaches, no matter their level of education or intelligence; such attempts can be likened to squaring the circle (44, 46).

In another vein, researchers from outside a given discipline, and who are thus less vested in the theories of that domain themselves, could initiate studies to determine whether insufficient statistics, exaggerated claims, drawing the wrong conclusions from other papers, or using data selectively to confirm hypotheses might differ among studies that relate to disciplinary biases or moral issues (many hard-science topics ultimately impact issues of deep moral concern) versus those that do not. Within scientific disciplines, the appearance of group-norm–enforcing signed petitions could be used as indicators of the potential for pathologies of altruism; such petitions might communicate important, albeit unintended, information about the health of a discipline. Are entire disciplines shaped by papers that are not submitted because of legitimate fears of rejection? As Santiago Ramón y Cajal, the father of modern neuroscience, perceptively wrote: "...the good will of scientists is usually so paradoxical that they are more pleased by the defence of an obvious error which has become wide-spread than by the establishment of a new fact." (102) These thoughts were echoed recently in a predictably controversial paper by John Ioannidis pointing toward the shockingly high publication rate of false research findings. Iaonnidis noted: "...for many current scientific fields, claimed research findings may often be simply accurate measures of the prevailing bias" (103). Can disciplinary biases be quantified, perhaps in studies put forth by interdisciplinary groups (including nonacademics) from largely outside the discipline in question? Group-think within disciplines, particularly in regards to differing editorial standards of proof required for studies that do not hold to a discipline's underlying moral paradigm, would be a particularly rich, important, and provocative area of study.

Lilienfeld points toward psychological treatments that "may produce harm in relatives or friends of clients in addition to, or instead of, clients themselves. For example, some treatments that are otherwise innocuous or even effective with clients could produce a heightened risk of false abuse allegations against family members" (67). Is it possible that some social advocacy and social justice efforts result in the same types of pernicious effects on a societal scale so that efforts to build cooperation instead inhibit it? We often do not know, because well-meaning advocates have made raising those questions a taboo. Framing issues in the form of pathologies of altruism and altruism bias forms a mechanism for breaking through the taboo and making dispassionate studies of when helping is truly helping and when it is contributing inadvertent harm.

Forensic studies of allegiance bias (33) could profitably inform academic disciplines as to how to examine the effects of altruism bias both within and outside academia, and indeed, in regards to greater academia itself. In the later regard, it seems academia is reaching multiple crises, often arising from well-meaning efforts; such crises include administrative bloat, college tuitions that have vastly outpaced inflation, and students who are left academically adrift (104).

Potential Steps to Address Altruism Bias in Academic Disciplines and the Scientific Enterprise. There are active steps that could be taken to prevent the potential for altruism bias within the scientific enterprise. In all-important journal review processes, for example, mixed panels of reviewers (e.g., cognitive psychologists and neuroscientists reviewing social psychological papers) could become standard practice (105). Doctoral programs can place heavier emphasis on the scientific method and careful use of statistics so that graduate students, who are themselves future journal reviewers, can learn to spot problematic submissions more easily and perhaps be less likely to conduct problematic research themselves. The many aspects of altruism bias and the problems as well as benefits of empathy can be much more broadly discussed and emphasized in textbooks, beginning even in high school and the early years of college. Disciplines heavily involved in social advocacy, whose primary goal involves truly benefitting others, should be among the first to take interest in incorporating these concepts and approaches into research and training programs, editorial efforts, and textbooks.

Conclusions

Science has put extraordinary emphasis on studying the helpful aspects of altruism, and this emphasis has helped reify altruism's benefits among the general population. However, if science is truly to serve as an ultimately altruistic enterprise, then science must examine not only the good but also the harm that can arise from our feelings of altruism and empathetic caring for others. In support of this idea, it is important to note that during the twentieth century, tens of millions individuals were killed under despotic regimes that rose to power through appeals to altruism (106–110). The study of pathological altruism, in other words, is not a minor, inconsequential offshoot of the study of altruism but instead is a topic of overwhelming scientific and public importance.

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