UKCRC Centre of Excellence lessons learned 2008-2018 and future directions

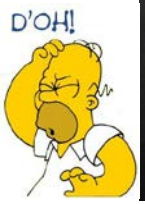
Professor Frank Kee

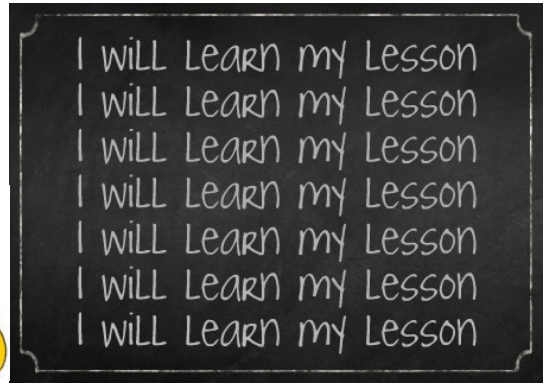
UKCRC Centre of Excellence lessons learned 2008-2018

- about collaboration

- about people

- about “new” research directions

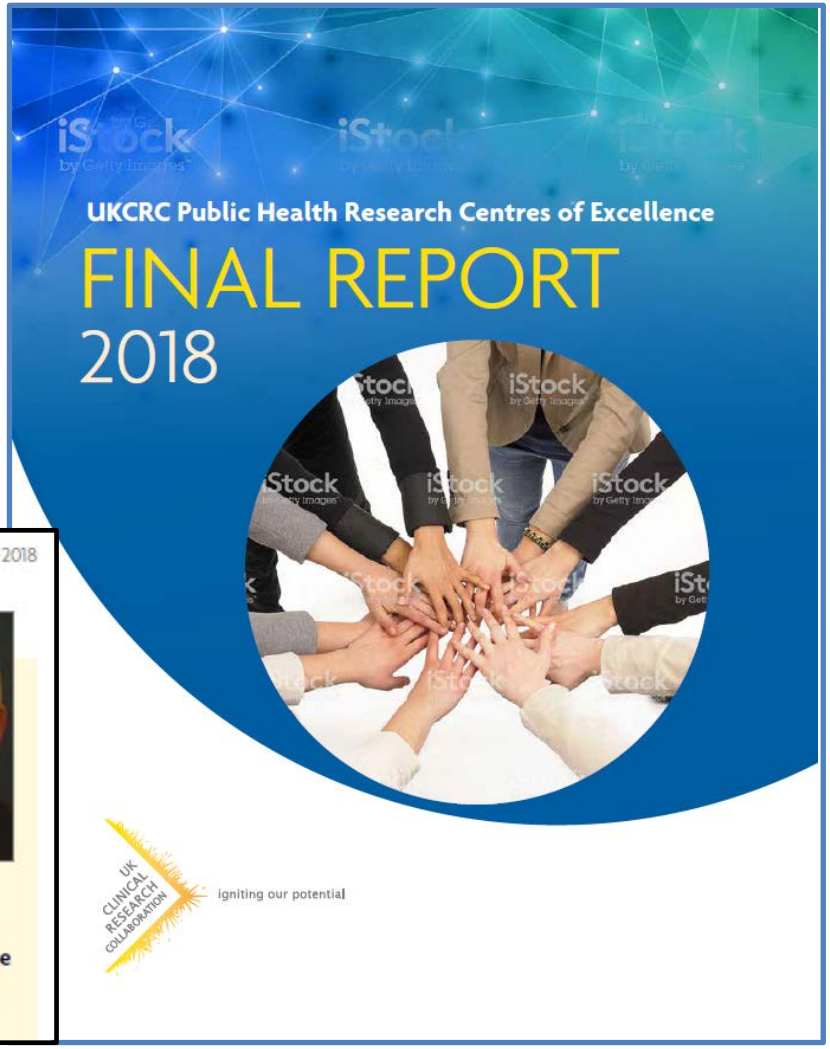


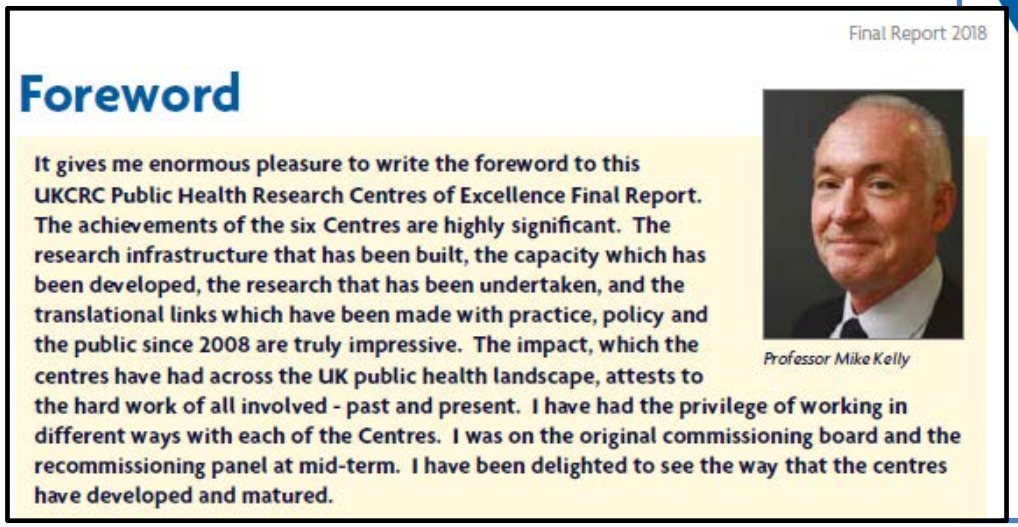


UKCRC Centre of Excellence lessons learned

Core mission

- Increase infrastructure
- Build academic capacity
- Multidisciplinary working




Final Report 2018

Foreword

Professor Mike Kelly

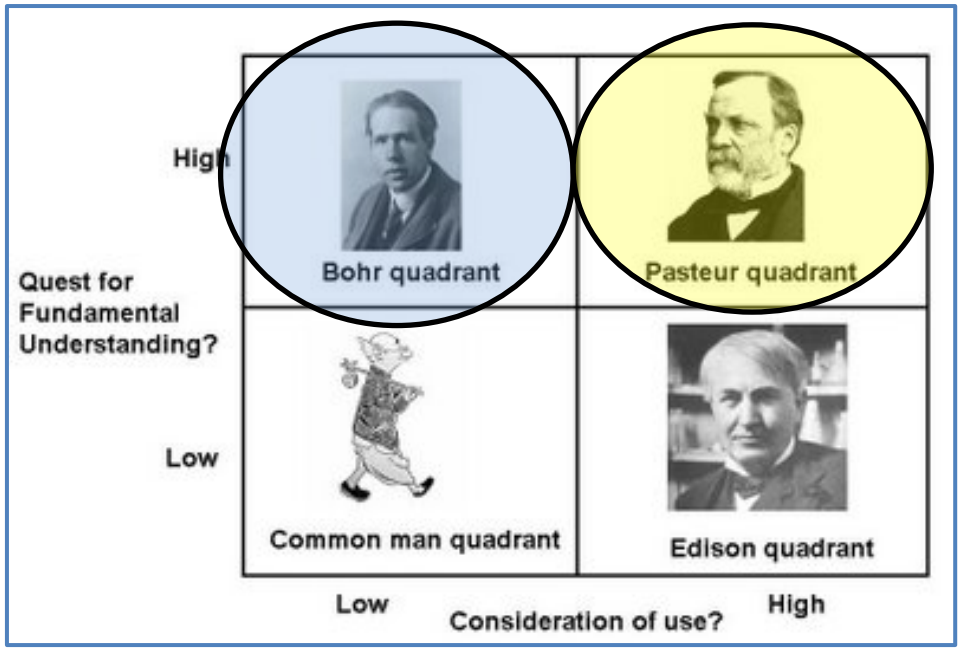
It gives me enormous pleasure to write the foreword to this UKCRC Public Health Research Centres of Excellence Final Report. The achievements of the six Centres are highly significant. The research infrastructure that has been built, the capacity which has been developed, the research that has been undertaken, and the translational links which have been made with practice, policy and the public since 2008 are truly impressive. The impact, which the centres have had across the UK public health landscape, attests to the hard work of all involved - past and present. I have had the privilege of working in different ways with each of the Centres. I was on the original commissioning board and the recommissioning panel at mid-term. I have been delighted to see the way that the centres have developed and matured.

UKCRC Centre of Excellence lessons learned 2008-2018

- about collaboration
- about people
- about “new” research directions

We prided ourselves that the science we were doing could not in any conceivable circumstances have any practical use. The more firmly one could make that claim the more superior one felt.

CP Snow, 1964



There is not pure science and applied science but only science and the applications of science

Louis Pasteur, 1863

Three Metaphors to Aid Interdisciplinary Dialogue in Public Health

Within this journal, authors have recently called for or discussed the benefits of interdisciplinary collaboration. However, in practice such collaborations are extremely challenging, and little guidance is available to support researchers' efforts to communicate with colleagues from other disciplines.

This article presents three metaphors from the sociology of scientific knowledge that can inform and support consideration and discussion of disciplinary issues. Disciplinary training acts as a "flashlight," highlighting certain features of reality and leaving others in shadow. Our disciplinary sense of normal science is the metaphorical "box" into which we hope nature will fit, determining the manner in which we advance the frontier by recognizing the familiar in the unfamiliar. Finally, scientific training is a "lens" through which the world is perceived and understood.

In interdisciplinary and some multidisciplinary contexts, researchers are encouraged to (1) identify the set of fundamental concepts underpinning their approach to public health, (2) discuss methodological choices in terms that do not depend on familiarity with a common tradition of research excellence, and (3) maintain awareness that colleagues from other fields potentially hold different understandings of key public health concepts. (*Am J Public Health*. 2018;108:1483–1486. doi:10.2105/AJPH.2018.304681)

Taya A. Collyer, MBiostat

Public health is a multidisciplinary field, and modern public health problems increasingly require cooperation between researchers from different disciplines. In practice however, interdisciplinary collaboration is extremely challenging and some collaborative projects fail.[1] As public health research and practice become more specialized,[2] the importance of integration and engagement across disciplinary lines increases. Additionally, the emergence and popularity of multidisciplinary "double-degree" programs suggests a felt need for researchers who can confidently and effectively cross-disciplinary boundaries. It was during the completion of a combined undergraduate degree in biomedical science and economics that my own sense of the importance of disciplinary training (and the difficulties reconciling disciplinary ideas about health) emerged.

In 2017, within this journal, authors called for or alluded to the benefits of interdisciplinary collaboration.[3–6] But peer-reviewed strategies for overcoming the challenges of collaborative research (which include "discipline-based differences in values, terminology, methods, and work styles"[3]) are limited. Improved awareness about the influence of disciplinary training in the design, conduct, and interpretation of public health research could enhance capacity for (and improve) sorely needed interdisciplinary work. However, to date this is a neglected area of empirical inquiry. Communication is understood to be key,[7] but little detailed guidance is available to support researchers' efforts to communicate with colleagues from other disciplines.

A relevant literature from the sociology of scientific knowledge (SSK) explores the ways scientific specialization shapes academic practice and output. Major strands of SSK include the Strong Programme[8] (which considers "true" and "false" scientific statements of equal sociological interest), the application of discourse analysis to science,[9] and reflexivity.[10] A separate, related area is science and technology studies, which includes actor-network theory.[11] Conclusions drawn within these literatures could provide practical guidance for researchers engaging with other scientific specialties. As SSK draws on wider sociological and philosophical writings, some concepts and terms may not be familiar or immediately accessible to all researchers, and the explanation of these ideas via metaphor may be helpful. The use of metaphor and analogy within science is the subject of an established literature, and metaphor seems to be a natural format for communication of scientific ideas.[12] The aim of this article is therefore to outline practical strategies for considering and discussing disciplinary issues via the presentation of 3 metaphors selected from SSK, including illustration via examples from public health.

The three metaphors below—likening scientific specialization to a flashlight, a box, and a lens—were selected for their relevance to the activities of individual scientists, the range of sociological concepts they illustrate, and the extent to which they demonstrate not only what disciplinary training *is*, but what it *does*. This last point is crucial, because by considering how disciplinary training functions in practice, strategies for overcoming disciplinary boundaries emerge. The presentation of specific metaphors unavoidably emphasizes or conceals particular features of the research process; however, this perhaps further demonstrates how alternative ways of thinking can lead us to different ideas. The three metaphors that follow combine to support the broad conclusion of much SSK literature, that researchers from different disciplines inhabit different intellectual, cultural, and

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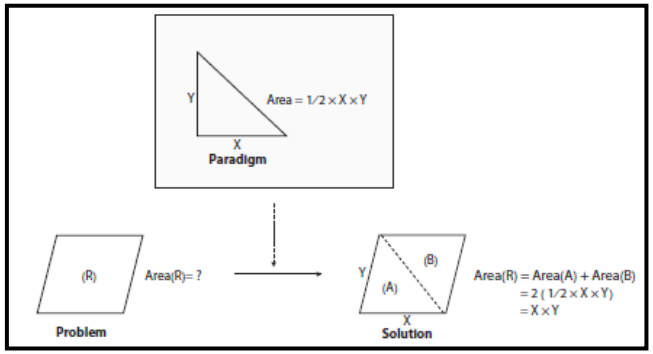
This article was accepted July 12, 2018.

doi: 10.2105/AJPH.2018.304681

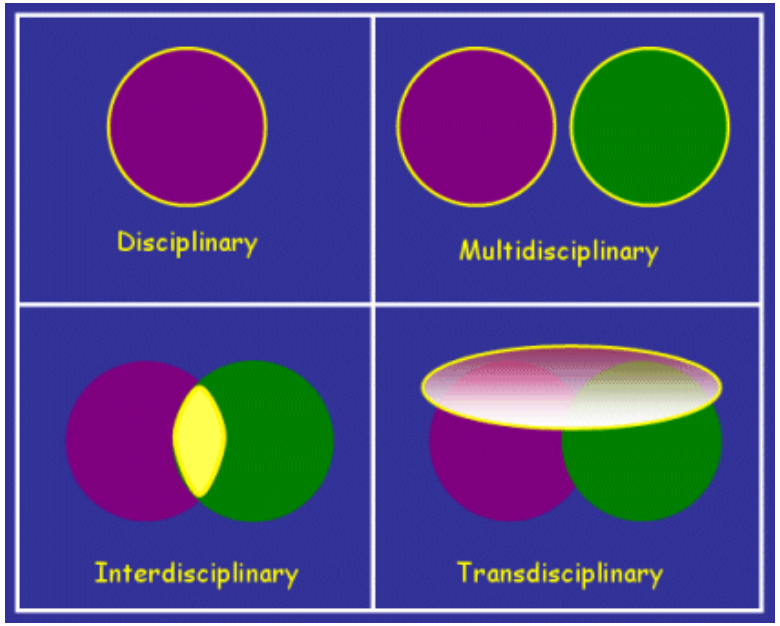
The flashlight metaphor

The lens metaphor



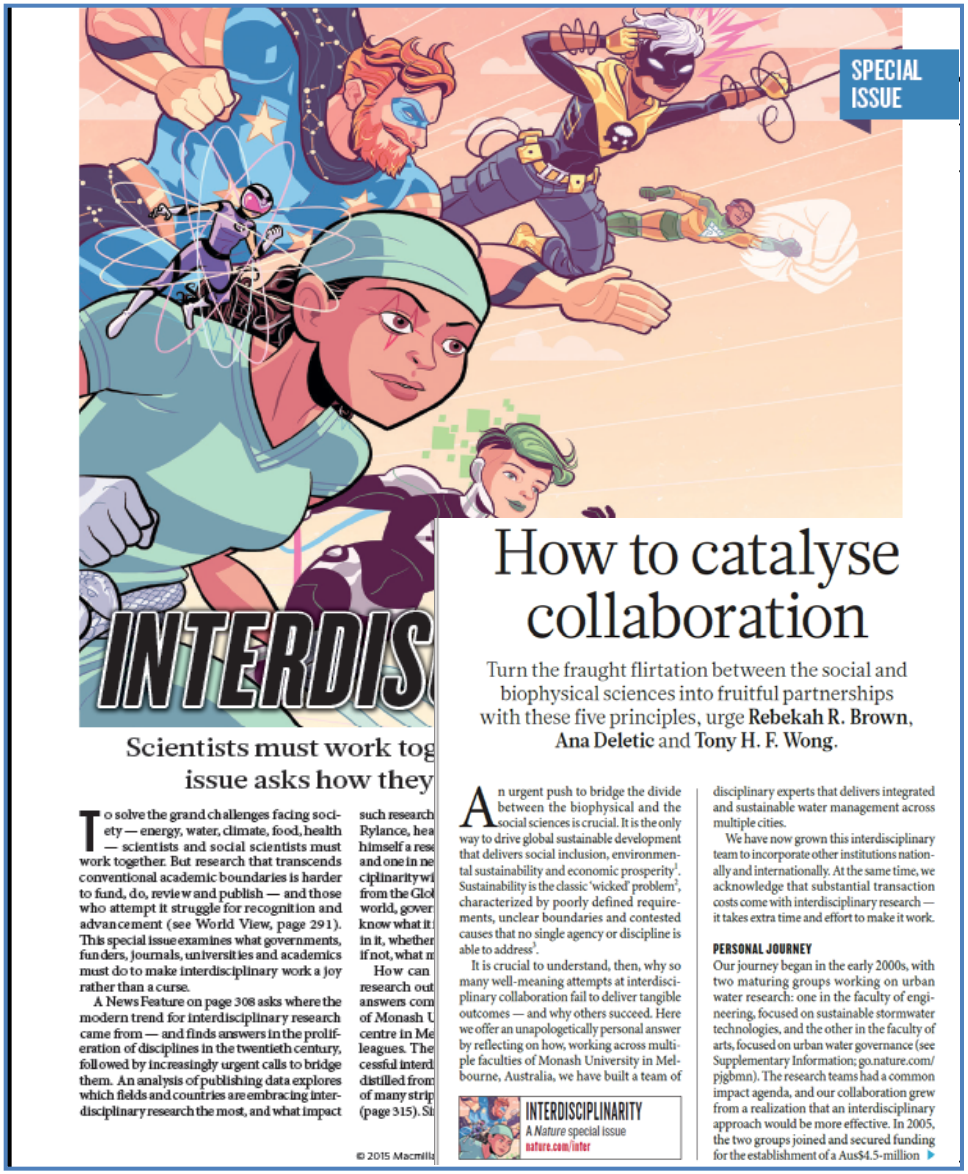
The toolkit metaphor

Working together



Bammer G. 2005

Shared Mission
Develop T shaped researchers
Nurture constructive dialogue
Bridge research and practice
Institutional support


SPECIAL ISSUE

INTERDIS

Scientists must work tog
issue asks how they

To solve the grand challenges facing society — energy, water, climate, food, health — scientists and social scientists must work together. But research that transcends conventional academic boundaries is harder to fund, do, review and publish — and those who attempt it struggle for recognition and advancement (see World View, page 291). This special issue examines what governments, funders, journals, universities and academics must do to make interdisciplinary work a joy rather than a curse.

A News Feature on page 308 asks where the modern trend for interdisciplinary research came from — and finds answers in the proliferation of disciplines in the twentieth century, followed by increasingly urgent calls to bridge them. An analysis of publishing data explores which fields and countries are embracing interdisciplinary research the most, and what impact

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How to catalyse collaboration

Turn the fraught flirtation between the social and biophysical sciences into fruitful partnerships with these five principles, urge **Rebekah R. Brown**, **Ana Deletic** and **Tony H. F. Wong**.

An urgent push to bridge the divide between the biophysical and the social sciences is crucial. It is the only way to drive global sustainable development that delivers social inclusion, environmental sustainability and economic prosperity[1]. Sustainability is the classic 'wicked' problem[2], characterized by poorly defined requirements, unclear boundaries and contested causes that no single agency or discipline is able to address[3].

It is crucial to understand, then, why so many well-meaning attempts at interdisciplinary collaboration fail to deliver tangible outcomes — and why others succeed. Here we offer an unapologetically personal answer by reflecting on how, working across multiple faculties of Monash University in Melbourne, Australia, we have built a team of disciplinary experts that delivers integrated and sustainable water management across multiple cities.

We have now grown this interdisciplinary team to incorporate other institutions nationally and internationally. At the same time, we acknowledge that substantial transaction costs come with interdisciplinary research — it takes extra time and effort to make it work.

PERSONAL JOURNEY

Our journey began in the early 2000s, with two maturing groups working on urban water research: one in the faculty of engineering, focused on sustainable stormwater technologies, and the other in the faculty of arts, focused on urban water governance (see Supplementary Information; go.nature.com/pjgbmn). The research teams had a common impact agenda, and our collaboration grew from a realization that an interdisciplinary approach would be more effective. In 2005, the two groups joined and secured funding for the establishment of a Aus$4.5-million

INTERDISCIPLINARITY
A *Nature* special issue
nature.com/inter

Academic and non academic partnerships - what we have learned -

- Spotting the opportunities that can create a “win-win” is sometimes arbitrary and often requires tact
- We have different languages and expectations
- We measure success in different ways

Article

Evaluation
2018, Vol. 24(4) 419–437
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The craft of evaluative practice: Negotiating legitimate methodologies within complex interventions

Steve Connelly
University of Sheffield, UK

Dave Vanderhoven
Independent researcher, Sheffield, UK

Abstract
Evaluations of complex interventions are likely to encounter tensions between different

Essay

Journal of Health Services Research & Policy
2018, Vol. 23(4) 262–267
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The art and science of non-evaluation evaluation

Lorelei Jones

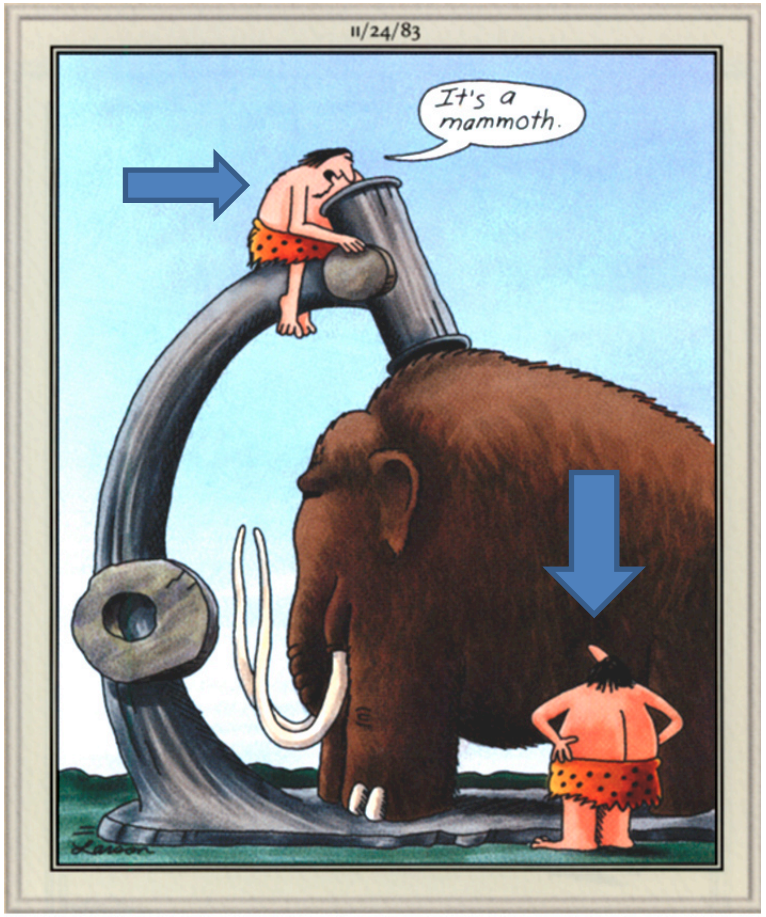
Abstract
This essay considers some limitations of programme theory evaluation in relation to healthcare policies. This approach, which seeks to surface ‘programme theories’ or construct ‘logic models’, is often unable to account for empirical observations of policy implementation in real-world contexts. I argue that this failure stems from insufficient theoretical elaboration of the social, cultural and political dimensions of healthcare policies. Drawing from institutional theory, critical theory and discourse theory, I set out an alternative agenda for policy research. I illustrate the issues with respect to programme theory evaluation with examples from my experience of research on large-scale strategic change in the English NHS.

UKCRC Centre of Excellence lessons learned

- about collaboration

- about people

- about “new” research d



Early microscope

Creativity is just connecting
things…A lot of people in ou
industry haven't had very di
experiences

**So they don't have enoug
to connect, and they end
very linear solutions with
broad perspective on the
problem**

The broader one's understa
of the human experience, th
better design we will have.

WORKING LIFE

By **Julian G. West**

Fortune favors the well read

"You found that in what journal?" My adviser, sitting across the desk from me as we discussed my next research project, raised his eyebrows in surprise. We had recently finished my first project and realized that our methods had some limitations. We needed to redesign our experiments, so I had done a lot of thinking and reading and had collected some preliminary results on new approaches. And based on some surprising sources, I had come up with an unusual proposal for advancing past the obstacles we had encountered.

"Actually, two journals," I replied somewhat sheepishly, "*Inorganic Chemistry* and *The Journal of Physical Chemistry*." We are organic chemists, and although the difference between our field and those represented by these two journals may seem small to a nonchemist, to specialists they are practically different planets. Neither of these journals is usually found near the desk of a card-carrying organic chemist—yet here we were discussing these two papers, the more recent of which was published 2 decades ago.

"I know that this sounds crazy," I continued, "but look at the reactivity that they saw." We craned our heads over the printouts. The authors of these papers had given little thought to whether their results had much bearing on our field—they weren't organic chemists, after all. However, being good scientists, they had made copious observations during their experiments, and sure enough, some had interesting implications for our studies. "I see what you mean," my adviser said, "but I don't know how you find these papers."

"I read widely to prepare myself for whatever might come along in the lab."

The answer is pretty simple: I aggressively curate and monitor the notifications I receive about newly published papers, and I read those that strike my interest, even if they're not directly related to my research. Then, if I find an interesting string of references in a paper I'm reading, I'll follow where it leads. That's how I found my way to those decades-old papers. Chemistry also has a small but vibrant blogging community, and sometimes a thoughtful post highlighting a recent paper will start me on one of my literature dives. If I find that many of these references come from the same source—*Inorganic Chemistry*, for example—I'll add it to the stable of journals that I follow.

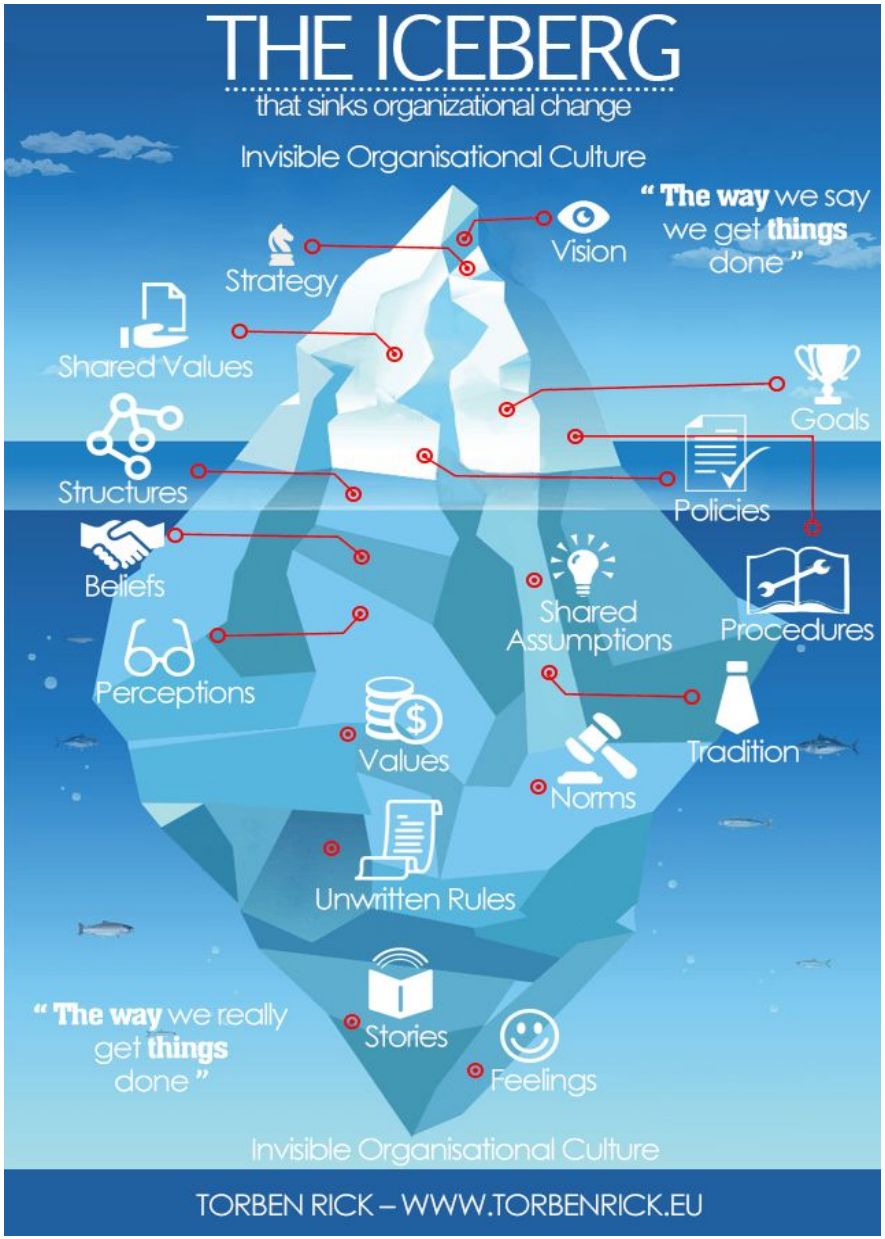
Perhaps the bigger question is why I make the effort. The short answer is that I read widely to prepare myself for whatever might come along in the lab. My biggest fear is the one that got away, the important discovery that I missed because I couldn't see it for what it was. It's this fear that drives me to cast my intellectual net widely, so that I have the broad foundation I need to see my research from multiple angles. Given the limited number of hours in each day, it can be tempting to read only in my subdiscipline, but I know that doing so would ultimately limit the kinds of connections I can draw. Fortune favors the prepared mind, as Louis Pasteur famously said to explain his scientific success, and I am doing my best to be prepared.

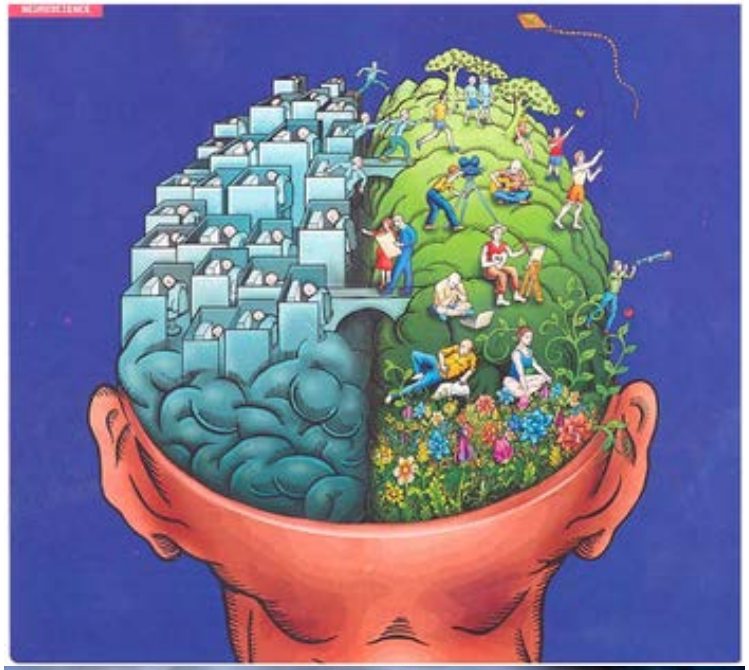
That conversation with my adviser was a few years ago. The intellectual leap inspired by those old papers enabled me to finish and publish my project, and I am now wrapping up my Ph.D. studies. As I look back on my graduate career, I realize that it's been replete with these sorts of situations. Time and time again, strange observations in the lab reminded me of a paper I had read in some far-out journal, or a seemingly irrelevant visiting speaker's talk suddenly led me to understand a result that had been bugging me for weeks. These are my favorite moments in research; the thrill of finally fitting disparate pieces together is tough to beat.

One of the new first-year students in our department recently asked me for advice on making it through graduate studies. I typically find that type of vague question tough to answer succinctly, but this one was easy: Read widely and voraciously. Fortune doesn't come every day, but when it does, you will be prepared to make the most of it. ■

Julian G. West is a doctoral student at Princeton University in New Jersey. Do you have an interesting career story? Send it to SciCareerEditor@aaas.org.

When English is your second language





Conflict is the gadfly of thought. It stirs us to observation and memory. It instigates to invention…and sets us at noting and contriving. Conflict is the sine qua non of reflection and ingenuity.

John Dewey.

UKCRC Centre of Excellence lessons learned

- about collaboration
- about people
- about “new” research directions

How might we know a 4* paper ?

Overarching criteria: originality, significance, rigour

- Scientific rigour
  - with regard to design, method, execution and analysis
- Addition to knowledge and conceptual frameworks
- Significance
- Scale, challenge and logistical challenge
- Logical coherence of arguments
- Contribution to theory building
- Advance in knowledge, skills, scholarship, practice, education, policy
- Applicability and significance to users

Original article

The tale wagged by the DAG: broadening the scope of causal inference and explanation for epidemiology

Nancy Krieger[1,*] and George Davey Smith[2]

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Accepted 13 April 2016

Abstract

'Causal inference', in 21st century epidemiology, has notably come to stand for a specific approach, one focused primarily on counterfactual and potential outcome reasoning and using particular representations, such as directed acyclic graphs (DAGs) and Bayesian causal nets. In this essay, we suggest that in epidemiology no one causal approach should drive the questions asked or delimit what counts as useful evidence. Robust causal inference instead comprises a complex narrative, created by scientists appraising, from diverse perspectives, different strands of evidence produced by myriad methods. DAGs can of course be useful, but should not alone wag the causal tale. To make our case, we first address key conceptual issues, after which we offer several concrete examples illustrating how the newly favoured methods, despite their strengths, can also: (i) limit who and what may be deemed a 'cause', thereby narrowing the scope of the field; and (ii) lead to erroneous causal inference, especially if key biological and social assumptions about parameters are poorly conceived, thereby potentially causing harm. As an alternative, we propose that the field of epidemiology consider judicious use of the broad and flexible framework of 'inference to the best explanation', an approach perhaps best developed by Peter Lipton, a philosopher of science who frequently employed epidemiologically relevant examples. This stance requires not only that we be open to being pluralists about both causation and evidence but also that we rise to the challenge of forging explanations that, in Lipton's words, aspire to 'scope, precision, mechanism, unification and simplicity'.

Philosophy and Phenomenological Research
Vol. LXXIV No. 2, March 2007

Précis of *Inference to the Best Explanation*, 2nd Edition*

PETER LIPTON
Cambridge University

A more promising approach construes ***best as loveliest***. On this view, we infer the hypothesis that would, if correct, provide the greatest understanding. Its central descriptive claim is that loveliness is a guide to likeliness, that the explanation that would, if correct, provide understanding, is the explanation that is judged likeliest to be correct. This at least is not a trivial claim, but it faces at least three challenges. The first is to identify the explanatory virtues, the features of explanations that contribute to the degree of understanding they provide. There are a number of plausible candidates for these virtues, including scope, precision, mechanism, unification and simplicity**. Better explanations explain more types of phenomena, explain them with greater precision, provide more information about underlying mechanisms, unify apparently disparate phenomena, or simplify our overall picture of the world.**

Other challenges are: to show that these aspects of loveliness match judgments of likeliness and that granting the match between loveliness and judgments of likeliness, the former is in fact our guide to the latter.

The C-Word: The More We Discuss It, the Less Dirty It Sounds

See also Galea and Vaughan, p. 602; Hernán, p. 616; Begg and March, p. 620; Ahern, p. 621; Chiolero, p. 622; Glymour and Hamad, p. 623; and Jones and Schooling, p. 624.

I thank Chiolero (p. 622), Ahern (p. 621), Glymour and Hamad (p. 623), Jones and Schooling (p. 624), and Begg and March (p. 620) for sharing their reactions to my commentary (p. 625). My impression is that there are few substantial disagreements among us, just differences in emphasis or, in one case, a misunderstanding.

Chiolero and Ahern zero in on a key issue: the need to distinguish the causal question from the procedure used to answer it. As Chiolero puts it, "How to formulate adequate causal questions had [not] been formalized" until recently in health research, and much of the teaching is devoted to "data management and analysis, leaving no room for causal thinking or for the formulation (before running the analyses) of research questions." Ahern stresses the importance of a structured process, or a roadmap, to ask and answer causal questions using observational data.

SPECIFY THE TARGET TRIAL

The first step of that process is, in Ahern's words, "to articulate the scientific question, including definition of the causal parameter of interest." Glymour and Hamad also highlight the importance of this first step when they state, "We must first start by articulating clear causal questions," which is especially true in social epidemiology when the goal is translating causal inferences into action.

One way of performing this step precisely is to specify the protocol of the hypothetical randomized trial that would allow us to estimate the causal parameter of interest. We refer to that hypothetical trial as the "target trial."[1] Some of us have argued that causal questions that cannot be translated into a hypothetical experiment are ill defined.[2] As a consequence of ill-defined questions, data analyses yield numerical estimates that are not easily interpretable as estimates of causal effect.

EMULATE THE TARGET TRIAL

The second step of the process is to emulate the target trial using a combination of data, empirically unverifiable assumptions, and statistical methods. Jones and Schooling are concerned that trying to emulate a target trial may drive too much attention to sophisticated statistical techniques (e.g., inverse probability weighting) for confounding adjustment at the expense of a thoughtful consideration of design issues and of expert knowledge summarized in causal theories. I suppose that the process of specifying and emulating a target trial can be misused but, if that happens, Jones and Schooling will find me by their side fighting for sound design and appropriate incorporation of expert knowledge in the process. Indeed, incorrect causal inferences from observational data are often the result of a flawed emulation of the basic design of the target trial (e.g., choice of time zero and classification of treatment groups) rather than of emulation of its randomized assignment (i.e., insufficient confounding adjustment).

Of course, specifying and emulating the target trial do not imply that our observational study "has fulfilled its purpose and correctly identified a causal effect," as Jones and Schooling warn us. It just means that (1) we can provide a scientific description of the causal effect that we are estimating, and (2) we have provided our best estimate of that causal effect. But, as Begg and March remind us, even our best estimate may be affected by systematic bias attributable to selection, confounding, or mismeasurement (reverse causation, also cited by Begg and March, can often be viewed as a form of confounding in which an undetected outcome or its precursors confound the effect of treatment on the detected outcome). Because these biases induce associations that do not have a causal interpretation, the association estimated from any data analysis is always causally suspect.

Again, the process of specifying and emulating a target trial helps by providing a systematic way to explore each type of bias and its potential influence on the effect estimate. The Cochrane tool has adopted this target trial–based approach to assess the risk of bias of nonrandomized studies.[3]

TRIANGULATE

Ultimately, no single study can produce uncontroversial estimates of causal effect. As Glymour and Hamad point out, some form of "triangulation" of studies will be needed. To quantify a causal effect, triangulation consists in explicitly emulating the target trial of interest using different methods and data sources. When some of those emulations are expected to be differentially affected by bias, investigators can use the imperfect estimates from each emulation to try to pinpoint or bound the magnitude of the true causal effect. The idea is analogous to the process by which travelers obtaining readings of radio waves at different positions can triangulate the position of the radio transmitter.

But the success of triangulation efforts to estimate causal effects requires that "causal" stop being considered the C-word that investigators and editors avoid. Only by precisely defining the causal effect of

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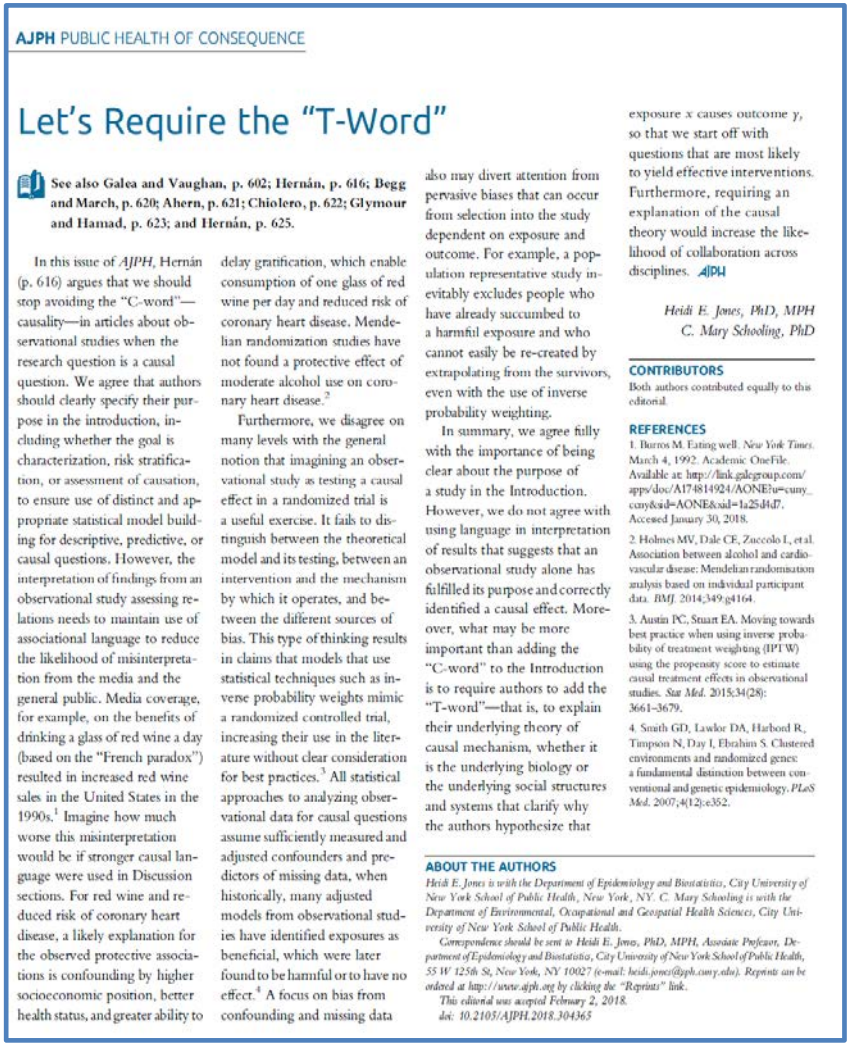
This editorial was accepted February 15, 2018.
doi: 10.2105/AJPH.2018.304392



Let's Require the "T-Word"

See also Galea and Vaughan, p. 602; Hernán, p. 616; Begg and March, p. 620; Ahern, p. 621; Chiolero, p. 622; Glymour and Hamad, p. 623; and Hernán, p. 625.

In this issue of *AJPH*, Hernán (p. 616) argues that we should stop avoiding the "C-word"—causality—in articles about observational studies when the research question is a causal question. We agree that authors should clearly specify their purpose in the introduction, including whether the goal is characterization, risk stratification, or assessment of causation, to ensure use of distinct and appropriate statistical model building for descriptive, predictive, or causal questions. However, the interpretation of findings from an observational study assessing relations needs to maintain use of associational language to reduce the likelihood of misinterpretation from the media and the general public. Media coverage, for example, on the benefits of drinking a glass of red wine a day (based on the "French paradox") resulted in increased red wine sales in the United States in the 1990s.[1] Imagine how much worse this misinterpretation would be if stronger causal language were used in Discussion sections. For red wine and reduced risk of coronary heart disease, a likely explanation for the observed protective associations is confounding by higher socioeconomic position, better health status, and greater ability to delay gratification, which enable consumption of one glass of red wine per day and reduced risk of coronary heart disease. Mendelian randomization studies have not found a protective effect of moderate alcohol use on coronary heart disease.[2]

Furthermore, we disagree on many levels with the general notion that imagining an observational study as testing a causal effect in a randomized trial is a useful exercise. It fails to distinguish between the theoretical model and its testing, between an intervention and the mechanism by which it operates, and between the different sources of bias. This type of thinking results in claims that models that use statistical techniques such as inverse probability weights mimic a randomized controlled trial, increasing their use in the literature without clear consideration for best practices.[3] All statistical approaches to analyzing observational data for causal questions assume sufficiently measured and adjusted confounders and predictors of missing data, when historically, many adjusted models from observational studies have identified exposures as beneficial, which were later found to be harmful or to have no effect.[4] A focus on bias from confounding and missing data also may divert attention from pervasive biases that can occur from selection into the study dependent on exposure and outcome. For example, a population representative study inevitably excludes people who have already succumbed to a harmful exposure and who cannot easily be re-created by extrapolating from the survivors, even with the use of inverse probability weighting.

In summary, we agree fully with the importance of being clear about the purpose of a study in the Introduction. However, we do not agree with using language in interpretation of results that suggests that an observational study alone has fulfilled its purpose and correctly identified a causal effect. Moreover, what may be more important than adding the "C-word" to the Introduction is to require authors to add the "T-word"—that is, to explain their underlying theory of causal mechanism, whether it is the underlying biology or the underlying social structures and systems that clarify why the authors hypothesize that exposure x causes outcome y, so that we start off with questions that are most likely to yield effective interventions. Furthermore, requiring an explanation of the causal theory would increase the likelihood of collaboration across disciplines. AJPH

Heidi E. Jones, PhD, MPH
C. Mary Schooling, PhD

CONTRIBUTORS

Both authors contributed equally to this editorial.

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This editorial was accepted February 2, 2018.
doi: 10.2105/AJPH.2018.304365

"What may be more important than adding the "C-word" to the Introduction is to require authors to add the "T-word"—that is, to explain their underlying theory of causal mechanism, whether it is the underlying biology or the underlying social structures and systems that clarify why the authors hypothesize that exposure x causes outcome y, so that we start off with questions that are most likely to yield effective interventions."

Research Question

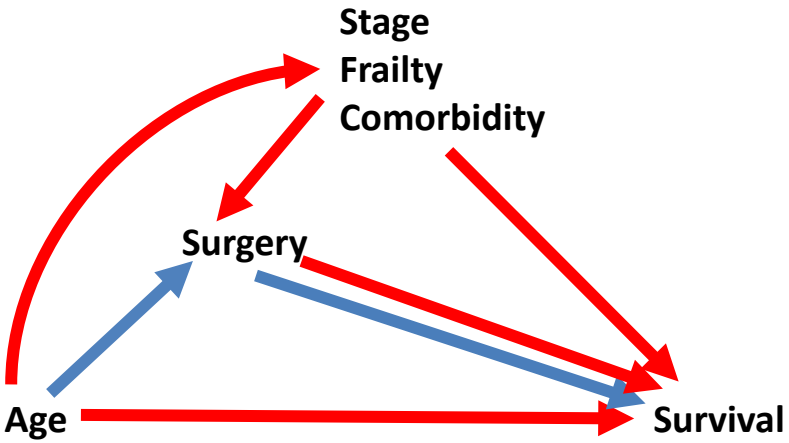
Is there evidence of ageism in access to potentially curative surgical treatments for lung cancer?

Can we estimate the proportion of the effect of age on survival that is mediated through surgery using the **g-computation formula**.

Total Causal Effect of age on survival

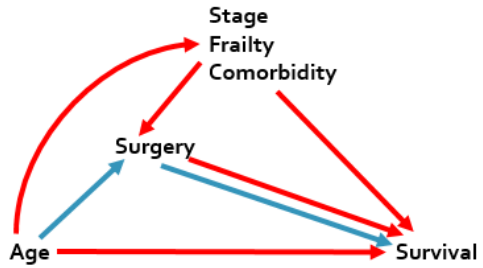
1) Direct Effect of age on survival (NDE)

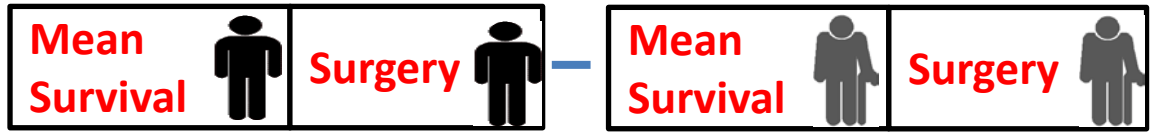
2) Natural Indirect Effect (NIE) acting through surgery = under-treatment



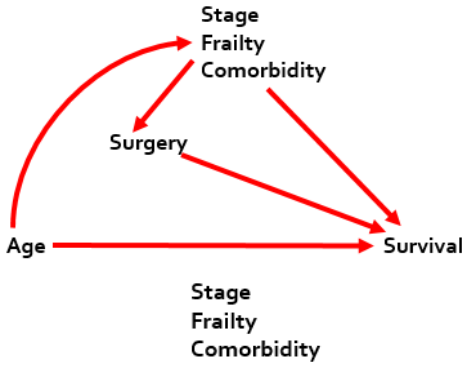
Methodology

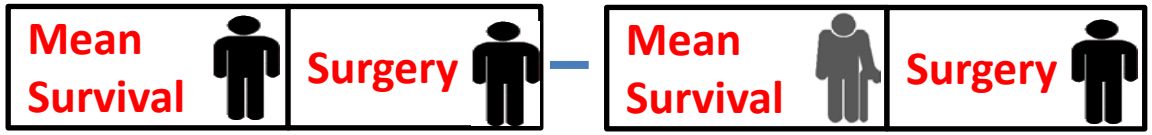
TCE =



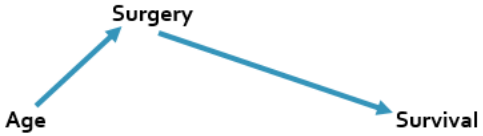


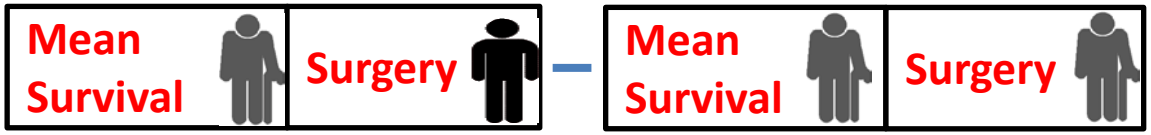
1) NDE=



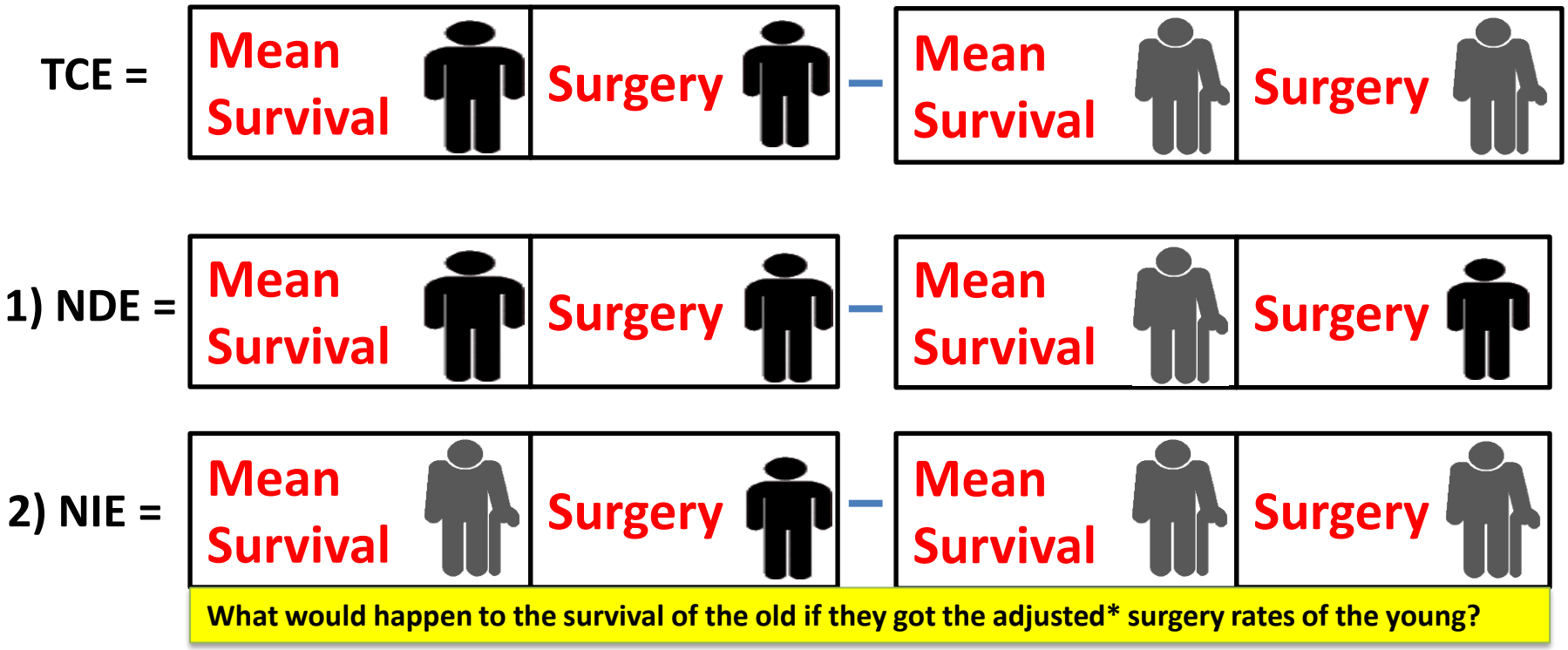


2) NIE =





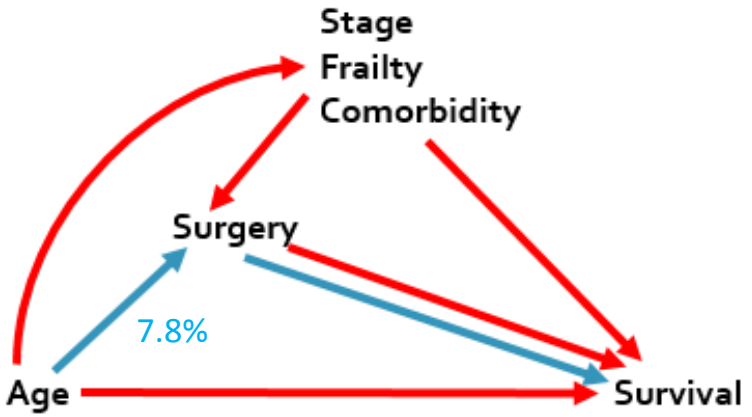
Methodology



*Adjusted for stage, frailty and comorbidity

Results

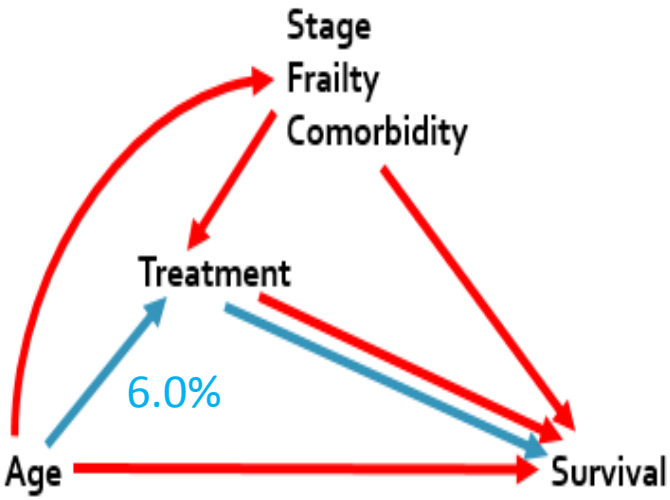
Curative surgery	
Younger	Elderly
33%	14%



Total reduced 2- year survival <75 vs ≥75	TCE	23.8% (p<0.05)
reduced survival <75 vs ≥75	NDE	16.6% (p<0.05)
	NIE	7.8% (p<0.09)

Results

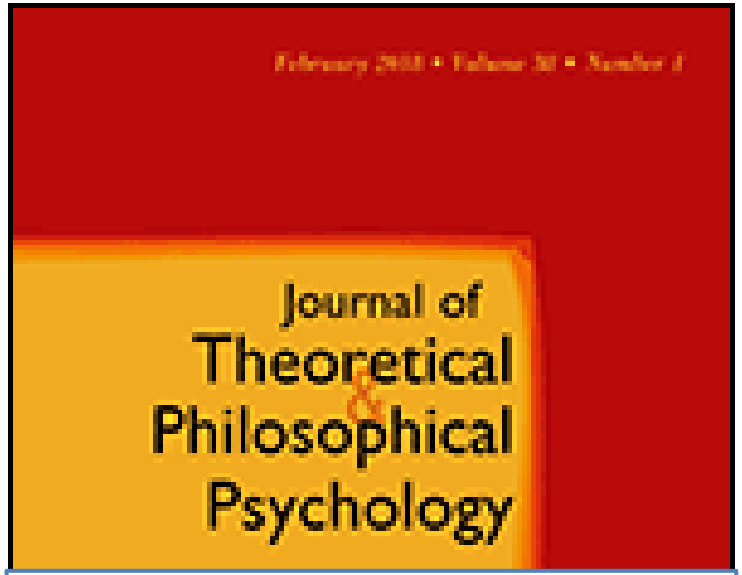
Treatment ≥75 (adjusted OR)		
Surgery	Radio	Chemo
0.18	0.51	0.18



Total reduced 1- year survival <75 vs ≥75	TCE	15.9% (p<0.001)

reduced survival <75 vs ≥75	NDE	9.9% (p<0.001)

NIE	6.0% (p<0.001)



American Psychological Association | Theoretical & Philosophical Psychology

Journal of Theoretical an
Philosophical Psycholog

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1068-8471/18/$12.00

2018, Vol. 38, No. 4, 219–2
http://dx.doi.org/10.1037/teo00000

Conceptualizing Loneliness in Health Research: Philosophical and Psychological Ways Forward

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Queen's University Belfast

Brian A. Lawlor
Trinity College Dublin

Increasing attention is being paid to loneliness, and to its impact on the health of older people, across numerous disciplines including psychology, public health, social policy, and psychiatry. In tandem, there has been increasing interest in the impact of social factors on health. However, definitions of loneliness are disparate, and a consensus on its meaning is arguably lacking. Often, loneliness is conflated with similar but distinct concepts such as social isolation, absence of social support, or a lack of social connectedness. We submit that the concept of loneliness requires clarification, especially in the extant health literature. We attempt to synthesize theories of loneliness provide a framework for future interventions. We further argue that the necessary clarification can be achieved using both empirical and nonempirical methodologies, under a transdisciplinary effort. We describe the potential for psychology, public health, and philosophy to come together to achieve this conceptual clarity around loneliness and to develop effective interventions on this problematic experience as a result.

Keywords: loneliness, older adults, public health, transdisciplinarity, existential phenomenology

RESEARCH ARTICLE

International Journal of Geriatric Psychiatry

The discrepancy between social isolation and loneliness as a clinically meaningful metric: findings from the Irish and English longitudinal studies of ageing (TILDA and ELSA)

JE McHugh[1,2], RA Kenny[1], BA Lawlor[1], A Steptoe[3] and F Kee[2]

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[2]Centre for Public Health, Queen's University Belfast, BT12 6BJ, UK
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Objective: Scant evidence is available on the discordance between loneliness and social isolation among older adults. We aimed to investigate this discordance and any health implications that it may have.

Method: Using nationally representative datasets from ageing cohorts in Ireland (TILDA) and England (ELSA), we created a metric of discordance between loneliness and social isolation, to which we refer as *Social Asymmetry*. This metric was the categorised difference between standardised scores on a scale of loneliness and a scale of social isolation, giving categories of: Concordantly Lonely and Isolated, Discordant: Robust to Loneliness, or Discordant: Susceptible to Loneliness. We used regression and multilevel modelling to identify potential relationships between *Social Asymmetry* and cognitive outcomes.

Results: *Social Asymmetry* predicted cognitive outcomes cross-sectionally and at a two-year follow-up, such that Discordant: Robust to Loneliness individuals were superior performers, but we failed to find evidence for *Social Asymmetry* as a predictor of cognitive trajectory over time.

Conclusions: We present a new metric and preliminary evidence of a relationship with clinical outcomes. Further research validating this metric in different populations, and evaluating its relationship with other outcomes, is warranted.

Regular Issue Article

Selecting Appropriate Cases When Tracing Causal Mechanisms

Derek Beach[1] and Rasmus Brun Pede

Abstract

The last decade has witnessed resurgence in the
causal mechanisms linking causes and effects. This
the methodological consequences that adopting a
of mechanisms has for what types of cases we sh
in-depth case study methods like process tracing.
three steps. We first expose the assumptions tha
causal mechanisms as systems that have methodo
case selection. In particular, we take as our point
based position, where: causation is viewed in d
metric terms, the focus is ensuring causal hom
research to enable cross-case inferences to be n

Article

Process tracing and congruence analysis to support theory-based impact evaluation

2018, Vol
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sagepub.co.uk/journals
DOI: 10.1177/135
journals.sagepu

Benedict Wauters
Flemish Department of work and social economy, Belgium

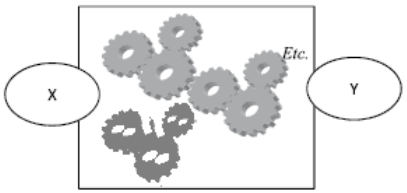
Derek Beach
Aarhus University, Denmark

Abstract

Theory-based impact evaluations have been put forward increasingly as an alte
counterfactual impact evaluations. However, this raises questions regarding the fou
drawing causal inference on the basis of such approaches. Case study methods suc

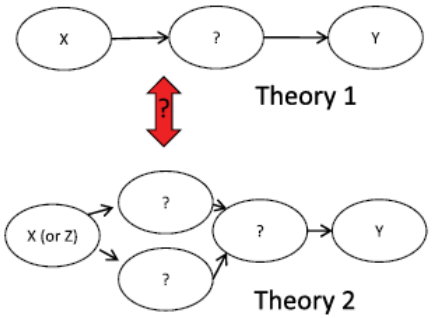
Process tracing

Theory 1



Casual inference based on unbroken chain of action and reaction between X and Y: is the mechanism present?

Congruence



Assessing relative strength of evidence for different theories: is theory 1 better supported by evidence than theory 2?

Article

Sociological Methods & Research
1-31

DOI: 10.1177/0049124117729700
journals.sagepub.com/home/smr
SAGE

Designing Research With Qualitative Comparative Analysis (QCA): Approaches, Challenges, and Tools

Eva Thomann[1] and Martino Maggetti[2]

Abstract

Recent years have witnessed a host of innovations for conducting research with qualitative comparative analysis (QCA). Concurrently, important issues surrounding its uses have been highlighted. In this article, we seek to help users design QCA studies. We argue that establishing inference with QCA involves three intertwined design components: first, clarifying the question of external validity; second, ensuring internal validity; and third, explicitly adopting a specific mode of reasoning. We identify several emerging approaches to QCA rather than just one. Some approaches emphasize case knowledge, while others are condition oriented. Approaches emphasize either substantively interpretable or redundancy-free explanations, and some designs apply an inductive/explorative mode of reasoning, while others integrate deductive elements. Based on extant literature, we discuss issues surrounding inference with QCA and the tools available under different approaches to address these issues. We specify

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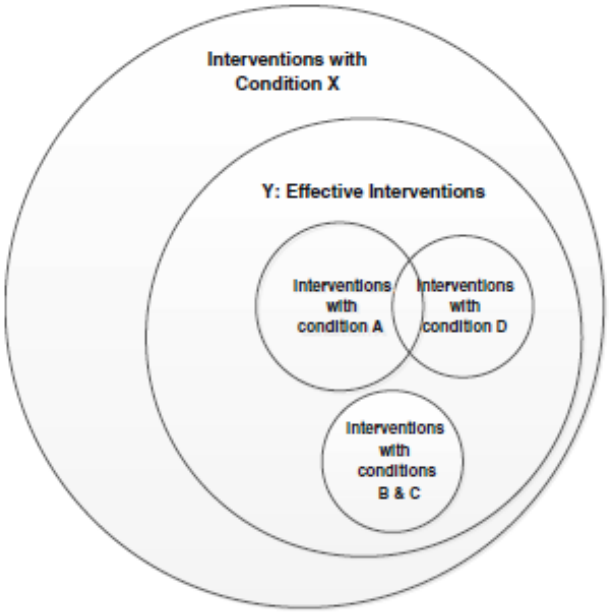
[2] Institute of Political, Historical and International Studies (IEPHI), University of Lausanne, Lausanne, Switzerland

Table 1 | Sample of a hypothetical truth table for crisp sets

Condition A	Condition B	Condition C	Cases	Proportion of cases that exhibit the outcome Pr (Y)
1	1	1	5	1.00
1	1	0	2	0.50
1	0	1	3	0.33
1	0	0	2	1.00
0	1	1	1	0.00
0	1	0	3	0.00
0	0	1	4	0.75
0	0	0	3	0.00

1 fully in the set, *0* fully out of the set



Necessary conditions are supersets of an outcome set.

- Condition X is a superset of the outcome set Y.
- X is necessary for Y. However, X does not guarantee the outcome Y. A case can have X, but still be outside of the set Y.

Sufficient conditions are subsets of an outcome set.

- Conditions A, D, and the combination of B and C are subsets of the outcome set Y.
- Any one (A, or D, or B & C) of the sufficient conditions is linked to the outcome Y. All cases with any one of these conditions are within the set Y.

Fig. 1 | **Necessary and sufficient conditions and set-theoretic relationships**

Health and Place 54 (2018) 170–177

Contents lists available at ScienceDirect

Health & Place

journal homepage: www.elsevier.com/locate/healthplace

Developing agent-based models of complex health behaviour

Jennifer Badham[a,*], Edmund Chattoe-Brown[b], Nigel Gilbert[c], Zaid Chalabi[d], Frank Kee[a], Ruth F. Hunter[a]

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ARTICLE INFO

Keywords:
Agent-based modelling
Health behaviour
Complex systems
Spatial modelling
Modelling non-communicable diseases

ABSTRACT

Managing non-communicable diseases requires policy makers to adopt a whole systems perspective that adequately represents the complex causal architecture of human behaviour. Agent-based modelling is a computational method to understand the behaviour of complex systems by simulating the actions of entities within the system, including the way these individuals influence and are influenced by their physical and social environment. The potential benefits of this method have led to several calls for greater use in public health research. We discuss three challenges facing potential modellers: model specification, obtaining required data, and developing good practices. We also present steps to assist researchers to meet these challenges and implement their agent-based model.

1. Introduction

Agent-based modelling (ABM) is a computational method that simulates individuals making decisions according to programmable rules. Those rules are set by the modeller to represent key elements of the real world decisions, including the individuals' own characteristics and their social and physical environment (Bonabeau, 2002; Epstein, 2006; Gilbert, 2008; Railsback and Grimm, 2011). This makes it particularly valuable where place is an important factor in behaviour. There have been several calls for greater use of ABM to understand public health issues and to formulate and evaluate plans to address them (including Auchincloss and Diez Roux, 2008; El-Sayed et al., 2012; Chalabi and Lorenc, 2013). These calls are consistent with broader encouragement of a complex systems perspective of public health issues (Luke and Stamatakis, 2012; Academy of Medical Sciences, 2016; Rutter et al., 2017).

This paper is aimed at public health researchers who have been persuaded by these calls to action and are considering their next steps. It is intended to assist potential modellers to assess whether ABM is a viable and useful method for their research question and set them on an appropriate path if the answer is 'yes'.

We start by describing relevant features of ABM, emphasising the particular way of thinking that is embodied in the method and the benefits of that framing. The paper then discusses three challenges that are particularly salient for public health researchers who wish to represent human behaviour in ABMs, such as researchers interested in non-communicable diseases, and how these challenges might be overcome. These challenges are: appropriately representing behaviour mechanisms, obtaining data to calibrate those mechanisms and validate the model, and developing the skills to undertake and report ABM based research.

2. Agent-based modelling: what and why?

Many issues in public health are complex; that is, behaviour of the system arises partly from interactions rather than simply the characteristics of the individuals within the system (Luke and Stamatakis, 2012; Rutter et al., 2017). Complex interactions can be conceptualised as social processes such as social influence and social support (Berkman et al., 2000), and as place effects such as air quality and transport availability (Macintyre et al., 2002). Complex systems also involve interactions through time, where actions in the past affect the future decision making context; for example the feedback cycle (presented in Rutter et al., 2017) where a smoking ban in public areas reduces the visibility of smoking, which reduces uptake and hence future visibility.

Models are used to help understand, interpret and forecast system

Network Science 6 (2): 265–280, 2018.
doi:10.1017/nws.2018.4

Simulating network intervention strategies: Implications for adoption of behaviour

JENNIFER BADHAM, FRANK KEE and RUTH F. HUNTER

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University Rd, Belfast BT7 1NN, United Kingdom
(*e-mail:* research@criticalconnections.com.au, f.kee@qub.ac.uk, ruth.hunter@qub.ac.uk)

Abstract

This study uses simulation over real and artificial networks to compare the eventual adoption outcomes of network interventions, operationalized as idealized contagion processes with different sets of seeds. While the performance depends on the details of both the network and behaviour adoption mechanisms, interventions with seeds that are central to the network are more effective than random selection in the majority of simulations, with faster or more complete adoption throughout the network. These results provide additional theoretical justification for utilizing relevant network information in the design of public health behavior interventions.

Keywords: *social contagion, network interventions, simulation*

WORLD VIEW *A personal t*

CLARISSA FAAS

The biggest risk? Viral

A century after the world's wor is undermining trust in vaccines

A hundred years ago this month, the death rate from the 1918 influenza was at its peak. An estimated 500 million people were infected over the course of the pandemic; between 50 million and 100 million died, around 3% of the global population at the time.

A century on, advances in vaccines have made massive outbreaks of flu — and measles, rubella, diphtheria and polio — rare. But people still discount their risks of disease. Few realize that flu and its complications caused an estimated 80,000 deaths in the United States alone this past winter, mainly in the elderly and infirm. Of the 183 children whose deaths were confirmed as flu-related, 80% had not been vaccinated that season, according to the US Centers for Disease Control and Prevention.

I predict that the next major outbreak — whether of a highly fatal strain of influenza or something else — will not be due to a lack of preventive technologies. Instead, emotional contagion, digitally enabled, could erode trust in vaccines so much as to render them moot. The deluge of conflicting information, misinformation and manipulated information on social media should be recognized as a global public-health threat.

So, what is to be done? The Vaccine Confidence Project, which I direct, works to detect early signals of rumours and scares about vaccines, and so to address them before they snowball. The international team comprises experts in anthropology, epidemiology, statistics, political science and more. We monitor news and social media, and we survey attitudes. We have also developed a Vaccine Confidence Index, similar to a consumer-confidence index, to track attitudes.

Emotions around vaccines are volatile, making vigilance and monitoring crucial for effective public outreach. In 2016, our project identified Europe as the region with the highest scepticism around vaccine safety (H. J. Larson *et al. EBioMedicine* 12, 295–301; 2016). The European Union commissioned us to re-run the survey this summer; results will be released this month. In the Philippines, confidence in vaccine safety dropped from 82% in 2015 to 21% in 2018 (H. J. Larson *et al. Hum. Vaccines Immunother.* https://doi.org/10.1080/21645515.2018.1522468; 2018), after legitimate concerns arose about new dengue vaccines. Immunization rates for established vaccines for tetanus, polio, tetanus and more also plummeted.

We have found that it is useful to categorize misinformation into several levels. Among the most damaging is bad science: people with medical credentials stoking overblown or unfounded fears. The canonical example is the 1998 publication by infamous former physician Andrew Wakefield purporting to show a link between autism and the measles, mumps and rubella (MMR) vaccine. Despite having his licence revoked and his work retracted, Wakefield persists in campaigning against the vaccine. Expert consensus alleges that his efforts have contributed to persistent vaccine anxieties and refusals, including a 2017 measles outbreak in Minnesota. Had Wakefield been

EMOTIONS A
VACCINES
VOLATI
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CRUCIAL FOR
OUTREA

Ethical Issues in Social Media Research for Public Health

Ruth F. Hunter, PhD, Aisling Gough, PhD, Niamh O'Kane, BSc, Gary McKeown, PhD, Aine Fitzpatrick, MSc, Tom Walker, PhD, Michelle McKinley, PhD, Mandy Lee, PhD, and Frank Kee, MD

Social media (SM) offer huge potential for public health research, serving as a vehicle for surveillance, delivery of health interventions, recruitment to trials, collection of data, and dissemination. However, the networked nature of the data means they are riddled with ethical challenges, and no clear consensus has emerged as to the ethical handling of such data.

This article outlines the key ethical concerns for public health researchers using SM and discusses how these concerns might best be addressed. Key issues discussed include privacy; anonymity and confidentiality; authenticity; the rapidly changing SM environment; informed consent; recruitment, voluntary participation, and sampling; minimizing harm; and data security and management.

Despite the obvious need, producing a set of prescriptive guidelines for researchers using SM is difficult because the field is evolving quickly. What is clear, however, is that the ethical issues connected to SM-related public health research are also growing. Most importantly, public health researchers must work within the ethical principles set out by the Declaration of Helsinki that protect individual users first and foremost. (*Am J Public Health*. 2018;108:343–348. doi:10.2105/AJPH.2017.304249)

Social media (SM) are a rapidly evolving set of technologies primarily encompassing a group of social networking sites, such as Facebook and Twitter, that enable efficient, free global communication within a social network. For many people, SM are reshaping their social world, rewriting the rules of social engagement and sociability, and the impact that this has on human behaviors makes it an important avenue for research.[1] SM use has grown nearly 10-fold in the past decade,[2] providing public health researchers with a range of new opportunities for large-scale engagement with the public. SM offer a platform for delivering dynamic, flexible, and interactive content; tailoring messages that express different sentiments; identifying audiences; and providing real-time updates on users' perspectives, and they serve as a vehicle for surveillance, health interventions, recruitment and collection of trial data, and dissemination of results[3,4] at little cost. It is important to acknowledge that each of these uses has different ethical issues.

The networked nature of SM data (i.e., relational data contained in social profiles) is distinct from that of data in traditional variable-based research; data points are not simply collected from individuals and aggregated to provide population estimates; rather, they are composed of interactions between multiple participants, usually on platforms owned by a third party. They are thus ill suited to standard consent models based on assumptions of individual sovereignty over personal data. To date, ethical handling of SM data in research has been controversial, and no clear consensus has emerged. This has resulted in different institutions and institutional review boards (IRBs) putting forward different guidance and recommendations, leaving them to learn through trial and error. Current legislation on data protection and informed consent lags behind the potential of these new technologies, and the ethical principles remain relatively underdiscussed. Moreover, emerging trends in these new technologies, for example, live streaming, make it impossible to predict all the new legal and ethical issues that public health researchers will face.

Public health research must adapt its traditional approaches, and quickly, to ensure that it complies with the highest possible ethical standards to protect the privacy of SM users. The ethical issues identified are relevant in all research contexts, but the fact that every digital interaction can become a unit of data makes these issues far more complex and not always within the researcher's control, nor is it within the control of individual persons to give consent. The rapid evolution of SM technologies means that any ethical guidance for researchers today may have a limited shelf life. Such a rapidly evolving world connotes the Red Queen hypothesis (i.e., "it takes all the running you can, to stay in the same place"). Thus, the aim of this article is not to enshrine inflexible prescriptions on what should or should not be done in every situation, but rather (1) to draw attention to the nature of the ethical considerations relating to SM and (2) to suggest approaches that public health researchers might usefully employ when addressing these ethical challenges.

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This article was accepted November 9, 2017.

doi: 10.2105/AJPH.2017.304249

nature human behaviour

LETTERS

https://doi.org/10.1038/s41562-018-0346-z

Social influence maximization under empirical influence models

Sinan Aral* and Paramveer S. Dhillon*

Social influence maximization models aim to identify the smallest number of influential individuals (seed nodes) that can maximize the diffusion of information or behaviours through a social network. However, while empirical experimental evidence has shown that network assortativity and the joint distribution of influence and susceptibility are important mechanisms shaping social influence, most current influence maximization models do not incorporate these features. Here, we specify a class of empirically motivated influence models and study their implications for influence maximization in six synthetic and six real social networks of varying sizes and structures. We find that ignoring assortativity and the joint distribution of influence and susceptibility leads traditional models to underestimate influence propagation by 21.7% on average, for a fixed seed set size. The traditional models and the empirical types that we specify here also identify substantially different seed sets, with only 19.8% overlap between them. The optimal seeds chosen under empirical influence

some dimensions of the problem have attracted more research interest than others.

The optimization framework has received the most attention, as researchers developed efficient discrete optimization strategies for choosing the seed set. The optimization is known to be NP-hard[15] and a greedy algorithm that achieves a $1-1/e$ approximation has been proposed previously[3]. Since then, multiple refinements have improved the computational efficiency of the procedure[16–18] and have implemented optimization in software that substantially reduces the run time of the original greedy algorithm[19–21]. However, the influence model, which specifies the influence diffusion process in the network (that is, how the behaviour of a set of seed nodes at time t diffuses to other nodes at time $t+n$), has received much less attention, except in some recent studies that describe algorithms for robust influence maximization in the presence of uncertainty in edge propagation probabilities or the influence functions[22,23]. Two broad classes of influence models exist in the current literature: threshold models and cascade models.

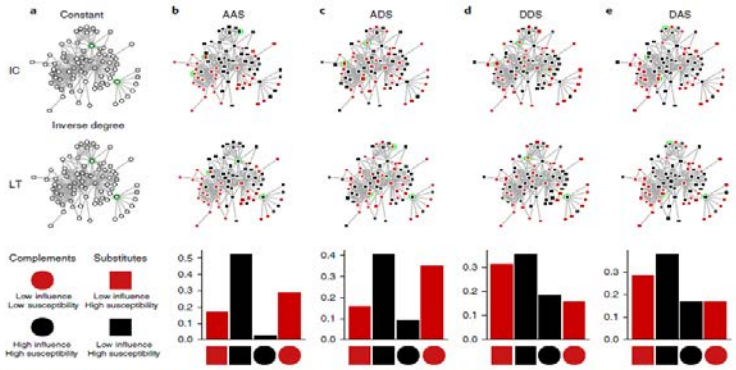

Fig. 1 | Parameterization of influence and susceptibility and implications for seed set selection. The same network is displayed, parameterized by four different models of the distribution of influence and susceptibility over nodes, characterized by four types of nodes: low influence and low susceptibility nodes, high influence and low susceptibility nodes, high influence and high susceptibility nodes and low influence and high susceptibility nodes. The optimal seed nodes selected under each model are outlined in green. **a**, Baseline IC and LT models for which propagation properties are specified as constant (top) and the inverse of node degree (bottom), respectively. **b**, Baseline IC and LT models for which propagation properties are specified according to the assortative influence, assortative susceptibility, substitute influence–susceptibility (AAS) model. **c**–**e**, The same information as in **b**, but for the assortative influence, disassortative susceptibility, substitute influence–susceptibility (ADS; **c**), disassortative influence, disassortative susceptibility, substitute influence–susceptibility (DDS; **d**) and disassortative influence, assortative susceptibility, substitute influence–susceptibility (DAS; **e**) empirical influence models. Distributions of the frequency of the four types of nodes with different influence and susceptibility characterizations are displayed underneath each graph or model. Seed sets differ substantially across different parameterizations of the graph, implying vastly different influence maximization results for the different models of influence and susceptibility.

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pproach

Wei[2]

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n refers to a group's tendency
arises from the network topol-
group. We follow this idea and
only relies on the social net-
particular, our model is a type
pularity by strategically form-
nd coalition is core stable. We
aphs and draw a link between
l cohesion [34]. We then focus
l network is socially cohesive
evertheless, we give two effi-
ers enjoy high popularity and

needs to belong to groups. By un-
rent social groups, one can explain
ns, group conformity, self-identity
s reveal that on arrival to Western
among relatives and acquaintances
acculturation into the new society
abitants in an Austrian village that
to farmland ownership [4].
ups are linked and develop bonds.
unity, which is considered from
Firstly, group cohesion refers to a
condly, cohesion can also refer to a
common ground from both views
acterised by both the micro-focus
d needs), and the macro-focus of
nge is therefore to build a general
ro-foci.
damental drives: *tasks*, and *social*
certain task; cooperation is desir-
a better collective outcome. Based

Mechanisms for **S**ocial Networks and Nor**M**s effects in **S**moking

The Mechanisms Study – a proof of concept study

- How are individual psychosocial and cognitive traits related to individual sensitivity to social norms?
- How does individual sensitivity to social norms cluster among friendship cliques and across school year groups?
- How are average social norms, measured at classroom level, affected by social network structures ?
- After the *ASSIST and Dead Cool* intervention: how are changes in attitudes, intentions and behaviours towards smoking related to social norms sensitivity at the individual level, and to average social norms at the class and year group level ?
- After the *ASSIST and Dead Cool* intervention: have smoking-related social norms changed and how are these changes correlated among friendship cliques?

- Disciplines and partners

- Education / schools based Trialists
- Games theorists/ behavioural economists
- Computer scientists
- Practitioners
- Public health and policy specialists
- **In NI and Bogota**

How might we know a 4* paper ?

- Applicability and significance to users

Whitty *BMC Medicine* (2015) 13:301
DOI 10.1186/s12916-015-0544-8

BMC Medicine

Medicine for Global Health

EDITORIAL Open Access

What makes an academic paper useful for health policy?

Christopher J. M. Whitty

Abstract

Evidence-based policy ensures that the best interventions are effectively implemented. Integrating rigorous, relevant science into policy is therefore essential. Barriers include the evidence not being there; lack of demand by policymakers; academics not producing rigorous, relevant papers within the timeframe of the policy cycle. This piece addresses the last problem. Academics underestimate the speed of the policy process, and publish excellent papers after a policy decision rather than good ones before it. To be useful in policy, papers must be at least as rigorous about reporting their methods as for other academic uses. Papers which are as simple as possible (but no simpler) are most likely to be taken up in policy. Most policy questions have many scientific questions, from different disciplines, within them. The accurate synthesis of existing information is the most important single offering by academics to the policy process. Since policymakers are making economic decisions, economic analysis is central, as are the qualitative social sciences. Models should, wherever possible, allow policymakers to vary assumptions. Objective, rigorous, original studies from multiple disciplines relevant to a policy question need to be synthesized before being incorporated into policy.

Keywords: Anthropology, Economics, Policy, Politics, Social science, Synthesis, Systematic reviews, Trials

Introduction

Health and science policy can mean many things, but in this paper, it is the decisions taken by regional, national or multilateral organisations that aim to have an impact on health, both international and domestic. These may be decisions on resource allocation, legislation or practice guidelines. Policy decisions are invariably weakened when they do not take account of the best current knowledge. Incorporating relevant research findings into policy and practice should therefore be central to the aims of those undertaking practically oriented health research, including in the basic and social sciences. There are a number of reasons policy decisions are not more evidence-based but three predominate. The first is simply that the research has not been conducted; for many important policy decisions it is impossible to be evidence-based because the evidence is currently not there. This is the responsibility and skill-set of academia, although policy-makers can help prioritize key questions. The second is a demand-side problem, with policymakers unwilling or unable to take account of good existing evidence. Those of us in the academic community often blame this demand-side weakness, but at least as much of a barrier is a supply-side problem; the academic community is often weak in producing papers usable in policy even when the evidence is there.

It is this third problem that this discussion piece sets out to explore: how can academics write papers that are more likely to be useful within policy? It should be the easiest to fix if, as academics and scientists, we are serious about trying to improve policy. I was asked to write it having just stopped being Chief Scientific Adviser at the UK Department for International Development (DFID). This role was an interface between science and policy, and I briefly also acted as director of policy. It is therefore one person's view rather than a consensus statement, with a bias to international development, but the points made are likely to be common ground to most policymakers trying to get policy based on the best available science. What makes a good scientific policy paper, defined as a paper likely to influence and improve policy decisions based on science?

Discussion

The starting point for any piece of communication, and a scientific paper is a form of communication, is: who is

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- Starting with an explicit description of the policy problem
- Improved methods for evidence synthesis
- Being explicit about methodological strengths and weaknesses
- Avoiding Baroque language and spurious precision
- Remembering the distinction between efficacy from effectiveness
- Making positive suggestions for what needs to be done to solve the policy problem
- Focussed challenges to current thinking
- Timeliness

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"Many good scientific papers are let down by simplistic, grandiose or silly policy implications sections; policy making is a professional skill;

Most scientists have no experience of it and it shows."

- Don’t think evidence speaks for itself
- Dispense with the idea that policy making is orderly
- Don’t imagine that if you publish, they will come
- Cultivate a mentor and do your homework
- Pick your battles
- Lots of patience, beware feeling left out.

HOW TO BE HEARD

By **Erik Stokstad**

PAUL CAIRNEY, a political scientist at the University of Stirling in the United Kingdom, has a message for those who want facts and research findings to guide policy. “‘Evidence based policy making’ is a good political slogan, but not a good description of the policy process,” he writes on his blog, which has become a popular read for policy wonks (paulcairney.wordpress.com). “If you expect to see it, you will be disappointed.” It’s a typically frank assessment from Cairney, who last year published a well-received book entitled *The Politics of Evidence-Based Policy Making*. But his goal isn’t to discourage efforts to inject evidence into statecraft; rather, he aims to arm scientists with some practical advice about the policymaking world that might help them do better. In a recent interview, Cairney offered some do’s and don’ts for getting involved.

Beware feeling left out.
Events like the election of fact-averse President Donald Trump can leave scientists feeling “that science has lost and feelings have won,” Cairney says. But many, if not most, government policies are developed by specialists, deep inside offices and departments experienced in policymaking. “That’s where scientists tend to have an easier ride and more of a place in the discussion.” And in some specialty arenas, such as analyzing drug risks or highway safety, “the scientific way of thinking” often dominates.

Don’t think the evidence speaks for itself.
“Well, it never does,” he says. “Don’t assume anyone cares.” Moreover, policymakers are already swimming in white papers, reports, and studies. A common refrain, Cairney says, is “I don’t have the time to consider all the information. How do I decide?” In that situation, scientists can play an important role as sifters, synthesizers, and analyzers.

Dispense with the idea that the policymaking process is orderly.
“If only life were so simple. It’s like a spirograph. A thousand cycles that interact in a big mess.” But don’t let the muddle prevent you from getting involved.

Don’t imagine that if you publish, they will come.
“You don’t drive a decision by the production of the evidence, by when you’ve published a paper or had a breakthrough,” Cairney says. Instead, for scientists who want their evidence to influence policy, it helps to be persistent, develop networks, and find the right moment. If you study better ways to prevent oil spills or reduce deadly medical mistakes, for example, be ready to reach out to policymakers at the next headlinemaking disaster. “If there’s huge attention, that’s the time to present your findings.”

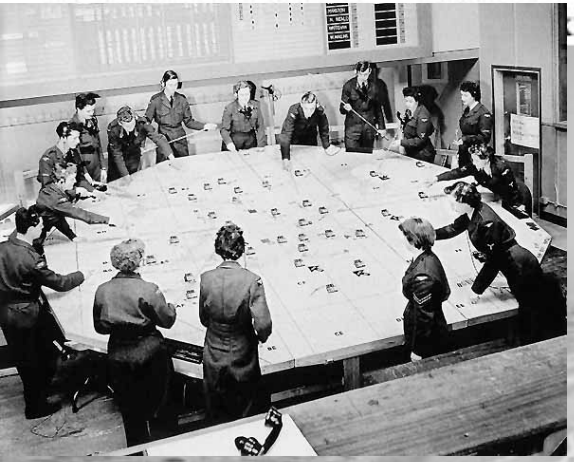
Cultivate a mentor, and do your homework.
“It takes a phenomenal amount of time to work out who is powerful in the political process,” Cairney says. So look for experts who are already involved, particularly insiders who are trusted by policymakers because they provide reliable information, are predictable, don’t make excessive demands, and don’t get upset if their advice isn’t always acted on. “Find these people and ask what you can do.”

Pick your battles.
“If you’re a scientist and you want to be influential, you either avoid those areas where emotions are highly charged, or find another way to engage,” Cairney counsels. Scientists who do get involved in highly politicized debates, such as those over stem cell research or genetically modified crops, should learn key techniques. They include ways of presenting technical information in persuasive and accessible language and images, and methods of recognizing and addressing an audience’s pre-existing concerns, values, and biases. “Unless you do that,” he warns, “your audience will switch off.”

Have patience, and lots of it.
Even in areas where researchers have developed strong evidence of cause and effect (think smoking and cancer), it can take decades to see a proportionate effect in policy, Cairney says. “That should be an anchor for scientists: Profound change will take 2 or 3 decades. That thinking would make people profoundly less dissatisfied with the process.” ■

PHOTO: SAM YEH/AFP/GETTY IMAGES

Science. Feb 2017



ford County and other LSTs conducting landing practice off San Diego, Calif.

Roisin

Pauline

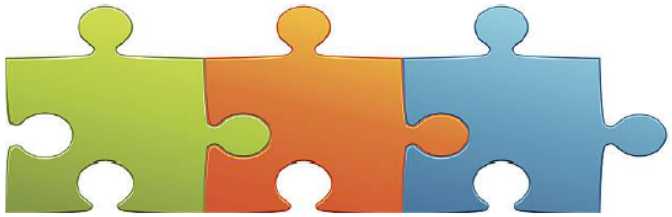

If you risk nothing,
Then you risk everything

QUEEN'S UNIVERSITY BELFAST

HDRUK Health Data Research UK

Swansea University Prifysgol Abertawe

Aligning with HDR UK priorities



Actionable Health Data Analytics

Core underpinning activity contributes to:

- Adding value to UK cohorts/UKSeRP
- System-wide patient journeys
- New and deep phenotypes to support individual/linked RPs

Modernising Public Health

Co-develop/combine population cohorts from Wales/NI with other areas of UK:

- observational studies
- natural experiments
- upstream and downstream *population level* inequalities research
- C.21st trials

(e.g. natural/built environment, asthma, CVD, cancer, mental health…)

Precision Medicine

- Refractory asthma, colorectal cancer, biomarker discovery and validation
- GA4GH data sharing leadership
- Digital pathology, scalable computing,
- European DTP Genomics/bioinformatics
- Centre for Nano Health (CNH), nano-Medicine

QUEEN'S UNIVERSITY BELFAST

HDRUK Health Data Research UK

Swansea University Prifysgol Abertawe

…transcending disciplines

- A ***Step-change*** in interdisciplinarity
- Bring new disciplines ***into the HDR domain***
- Assemble a ***unique combination*** of interdisciplinary expertise
- Train the ***next generation of data scientists*** to embrace interdisciplinary thinking and working

Epidemiologists
Statisticians
Health service researchers
Clinicians
Geographers
Demographers
Social scientists
Economists
Lawyers

Geneticists
Biologists

Image analysts
Computer scientists
Mathematicians
Engineers

UKPRP Prevention Research Partnership
Joint action for a healthier, fairer future.

Frequently Asked Questions (FAQs)

21 December 2017: New FAQs have been added at the end of this document addressing queries received about the current UKPRP funding call which closes on 18 January 2018.

PURPOSE & SCOPE

1) What is the purpose of UKPRP?

The purpose is to:

- fund research and network building to prevent non-communicable diseases (NCDs);
- build and support research teams, containing a range of relevant disciplines and non-academic partners, that are focussed on addressing a specific NCD prevention research question(s);
- fund research and network building to develop, implement and evaluate generalisable and scalable preventive policies/interventions;
- support interventions which will enable change within complex adaptive systems;
- foster solutions that are impactful at a population level and cost-effective;
- deliver improvements that meet the needs of providers and policy makers.

2) What will be the scope of the research?

- The UKPRP will examine the best ways of modifying common risk factors and upstream determinants of NCDs, and reducing inequalities in these through population level actions.
- It will develop and build on basic research in a number of relevant disciplines (e.g. social, biomedical, engineering, environmental and computing sciences), use and develop appropriate methods for evaluating the effectiveness and value of existing or novel preventive strategies.

3) How is UKPRP different to other initiatives on prevention?

- The funding is longer-term and large-scale.
- It is designed to support highly interdisciplinary groups, extending disease prevention research into areas like engineering and physical sciences and brings in experts from these areas that have not typically worked on disease prevention before.
- Research can be done across regions and sectors (e.g. NHS and non-NHS) and there is no one dominant methodological model (e.g. epidemiology or trials).
- Co-production of research with policy makers and practitioners is mandatory and can include industry (i.e. the commercial/business and profit-making private sector), if relevant to the research question(s).
- The research will not focus on individual behaviour(s) but look at the antecedents of NCDs that exist in the physical and social environment.

Key considerations

(looking through both ends of the telescope)

- Research funders processes and language and criteria **are different**
- Timeliness and responsiveness
- A variety of different types of evidence used for decision making
- Early engagement necessary for **co-production**
- Infrastructure, skills, capacity building and training
- Need to better appreciate where real evidence gaps exist
- Need to better appreciate each others roles
- What constitutes a “win-win” ?

Questions for you…..

- Better use of existing data and enhanced data for evaluation
  - Give me specific examples

- Better evaluation design
  - What does *"fit for purpose"* evidence/evaluation look like ?