Southwest Health Equity Research Collaborative
Manuscript Writing Workshop
May 15-16, 2019

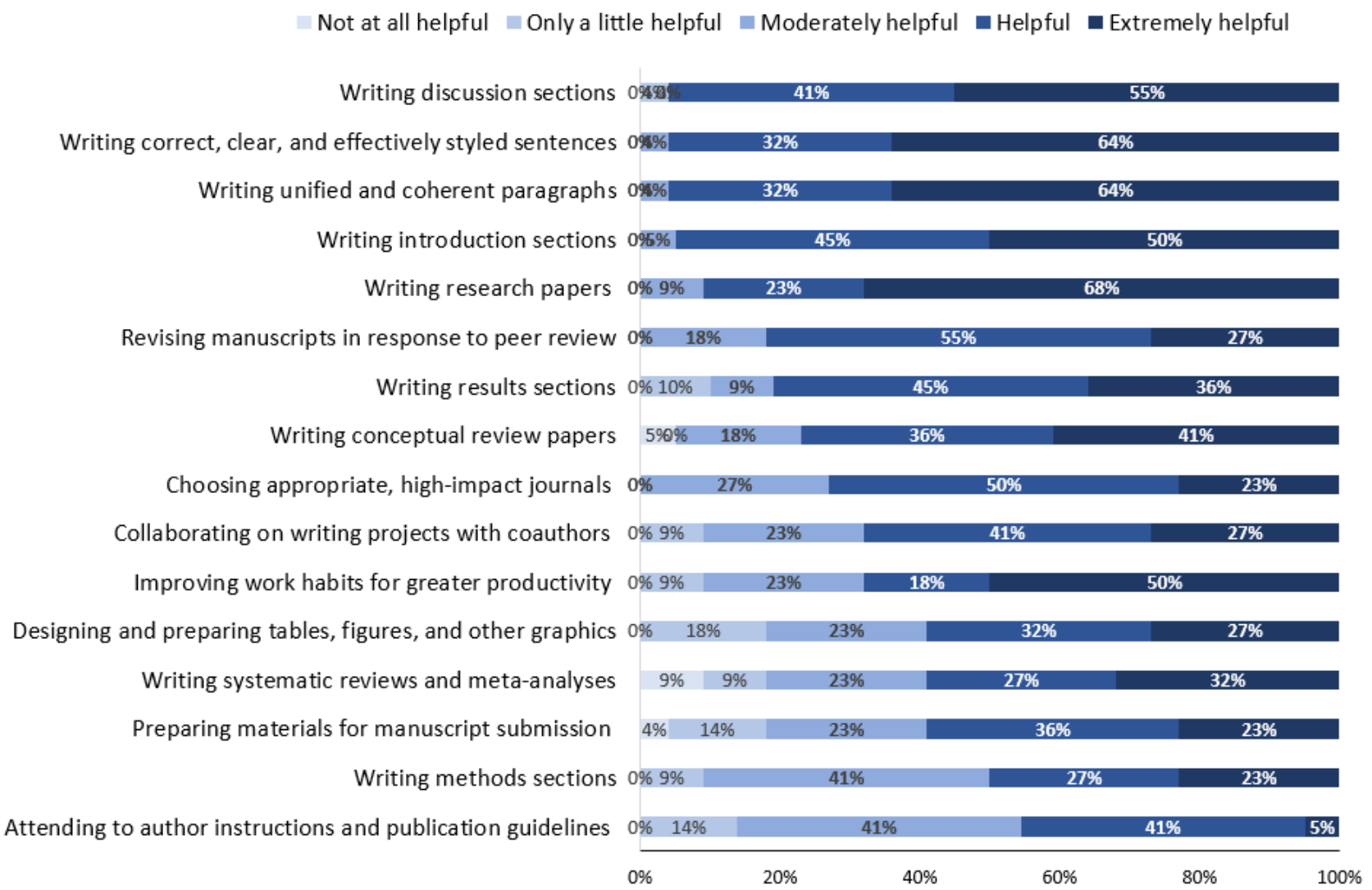
Laurence Greene, PhD

laurencesgreene@icloud.com

Workshop Goals

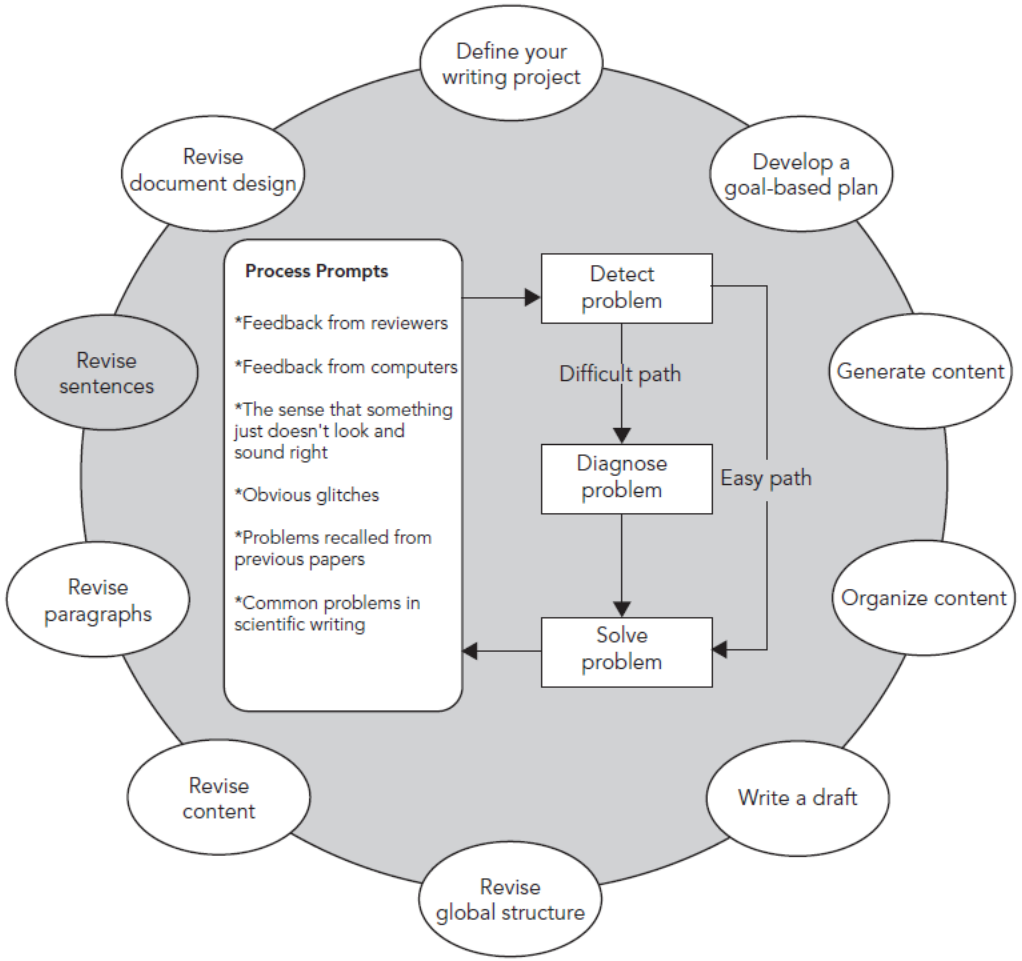
- Advance your training, knowledge, and skill in writing manuscripts for publication in high-impact journals
- Identify and reinforce what you're already doing well
- Identify areas and strategies for improvement
- Enhance your writing productivity
- Improve your skills for:
  - Collaborating with coauthors
  - Peer review
  - Teaching and mentoring your students

Your Ratings of Workshop Topic Helpfulness



Cultivating Intentions and Attitudes Toward Scientific Writing as . . .

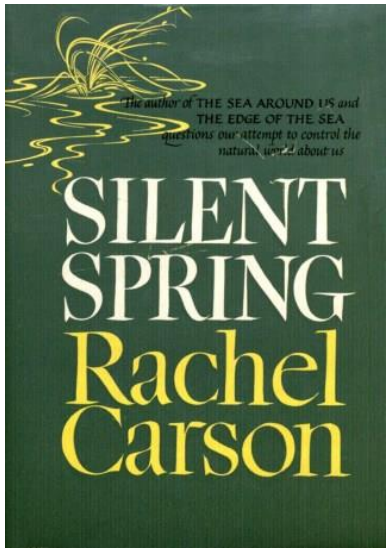
- A science and an art
- A complex, nonlinear, dynamic, and interactional *process*
- Cognitively demanding
- Goal-directed and audience-centered—at its very best
- Multilayered in units, or levels, of discourse
- *Hardly* romantic
- Often more problematic (challenging) the more skilled you become at it
- Ultimately *important* and *useful*



Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

It is, in the deepest sense, a privilege as well as a duty to have the opportunity to speak out — to many thousands of people — on something so important.

— Rachel Carson



Choosing Journals and Preparing to Submit Manuscripts

Strategies for Choosing Appropriate Journals

- Ask those who know—until you know
- Learn about the scope and aims of different journals
- Read author instructions carefully
- Consider each journal's:
  - Article authors
  - Readership—and what your work may offer the journal's readers
  - Recently published articles on research related to yours
  - Publication/open access fees
  - Time for peer review and online/print publication
  - Rigor, reputation, and *impact*

What do we mean by *impact* anyway and anymore?

The Impact Factor

- Calculation of a journal's impact factor for 2018:

  $$\frac{\text{\# of citations in 2018 to the journal's articles in 2016 and 2017}}{\text{\# of articles published in the journal in 2016 and 2017}}$$

- Available in the *Journal Citation Reports* database
- Used as a benchmark of a journal's impact relative to other journals in the same academic/research field
- Acknowledged by all as limited due to potential:
  - Effects of a few highly cited articles
  - Manipulation by journal practices

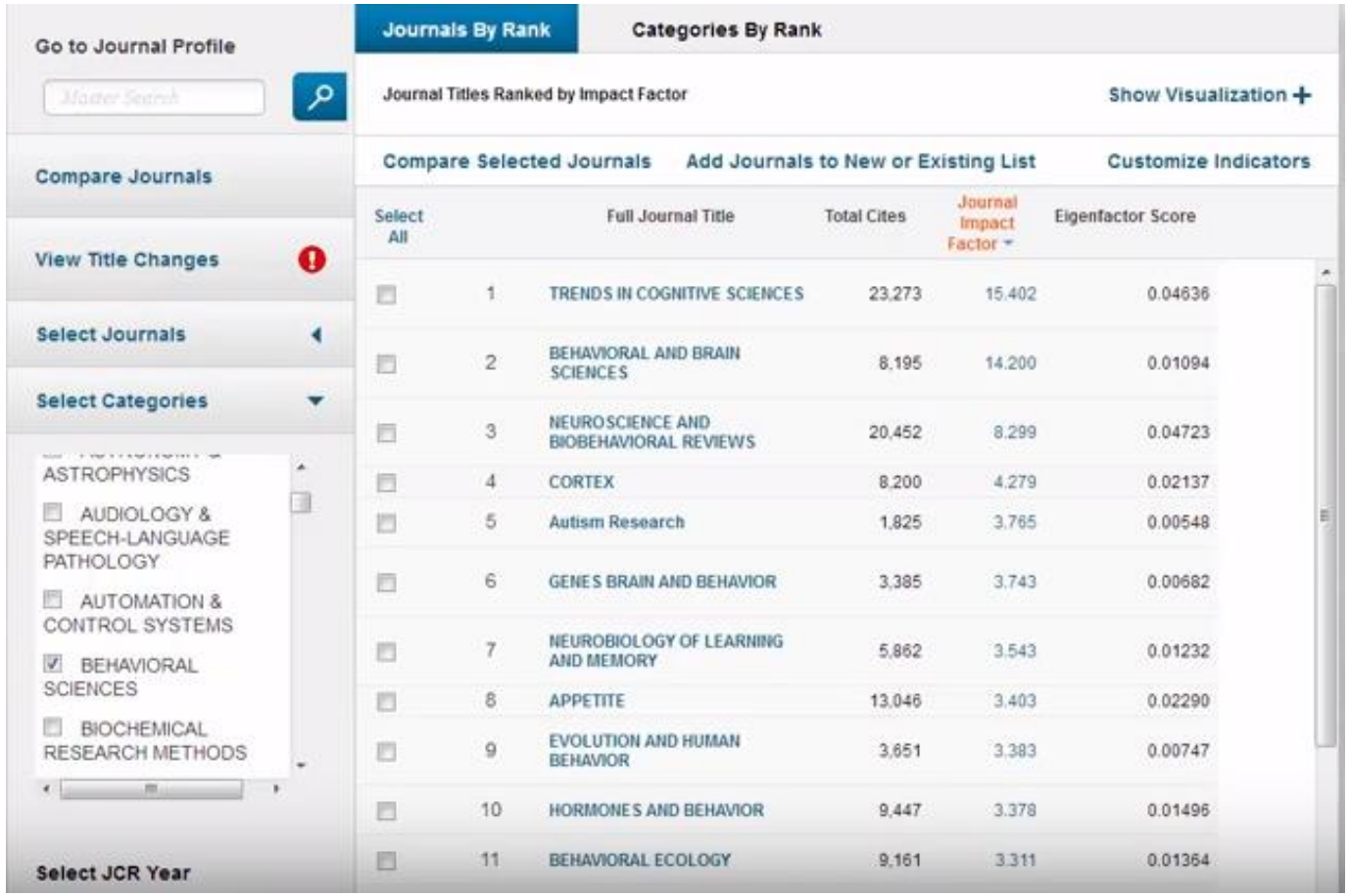
Medical Journals	Impact Factor
New England Journal of Medicine	79
Lancet	53
Nature Reviews Drug Discovery	50
Journal of the American Medical Association	48
Nature Reviews Cancer	43

What's a Good Impact Factor?

Based on 2016 Journal Citation Reports

Impact Factor	Number of Journals	Ranking (Top % of Journals)
10+	213	1.7%
9+	257	2.1%
8+	317	2.6%
7+	400	3.3%
6+	553	4.6%
5+	778	6.5%
4+	1251	10.4%
3+	2303	19.1%
2+	4388	36.4%
1+	8074	67.0%
0+	12061	100%

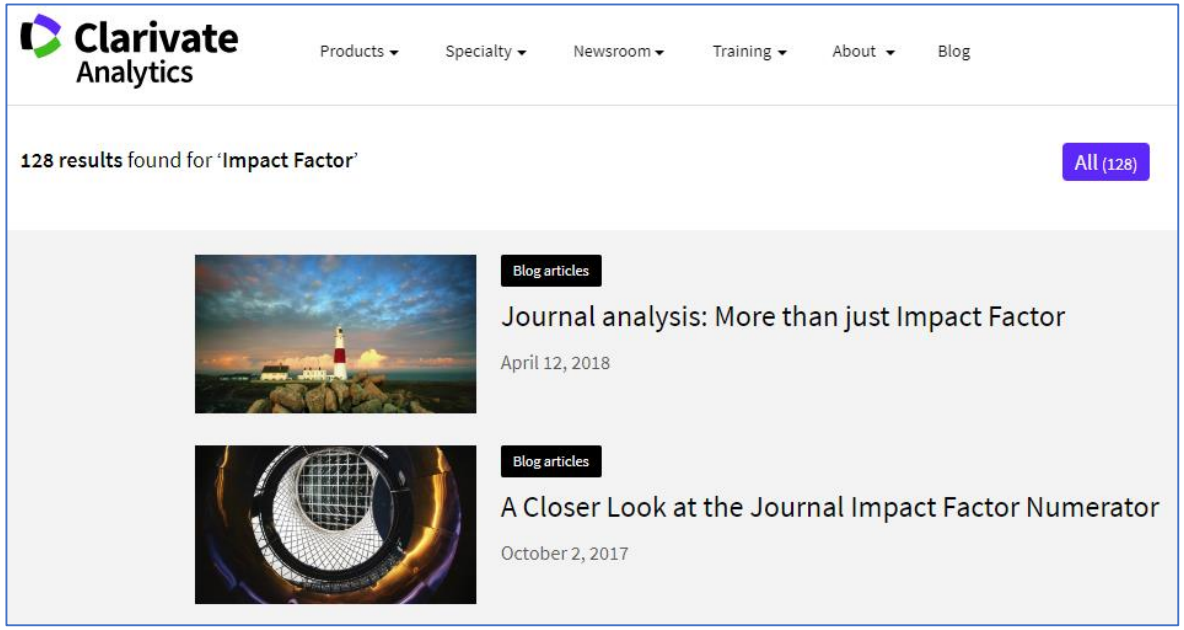
Impact Factors for Behavioral Sciences Journals in JCR



MD Anderson Center. http://mdanderson.libanswers.com/faq/26159

Other Measures of Impact

- Eigenfactor (www.eigenfactor.org)
- H-Index
- G-Index
- i10-Index
- Impact of your articles:
  - Downloads and views
  - Number of citations
  - Evidence of implementation



New publication metrics are changing views on impact

frontiers in Immunology | Microbial Immunology

Among the world's top 10 most-cited Immunology journals

IMPACT FACTOR 5.511

2017 JCR, Clarivate Analytics 2018

ORIGINAL RESEARCH ARTICLE
Front. Immunol., 30 October 2017 | https://doi.org/10.3389/fimmu.2017.01359

Induction of Broad-Spectrum Protective Immunity against Disparate *Cryptococcus* Serotypes

Marley C. Caballero Van Dyke[1,2], Ashok K. Chaturvedi[1,2], Sarah E. Hardison[1,2], Chrissy M. Leopold Wager[1,2], Natalia Castro-Lopez[1,2], Camaron R. Hole[1,2], Karen L. Wozniak[1,2] and Floyd L. Wormley Jr.[1,2]*

[1]Department of Biology, The University of Texas at San Antonio, San Antonio, TX, United States
[2]The South Texas Center for Emerging Infectious Diseases, The University of Texas at San Antonio, San Antonio, TX, United States

Cryptococcosis is a fungal disease caused by multiple *Cryptococcus* serotypes; particularly *C. neoformans* (serotypes A and D) and *C. gattii* (serotypes B and C). To date, there is no clinically available vaccine to prevent cryptococcosis. Mice given an experimental pulmonary vaccination with a *C. neoformans* serotype A strain engineered to produce interferon-γ, denoted H99γ, are protected against a subsequent otherwise lethal experimental infection with *C. neoformans* serotype A. Thus, we determined the efficacy of immunization with *C. neoformans* strain H99γ to elicit broad-spectrum protection in BALB/c mice against multiple disparate *Cryptococcus* serotypes. We observed significantly increased survival rates and significantly decreased pulmonary fungal burden in H99γ immunized mice challenged with *Cryptococcus* serotypes A, B, or D compared to heat-killed H99γ (HKH99γ) immunized mice. Results indicated that prolonged protection against *Cryptococcus* serotypes B or D in H99γ immunized mice was $CD4^+$ T cell dependent and associated with the induction of predominantly Th1-type cytokine responses. Interestingly, immunization with H99γ did not elicit greater protection against challenge with the *Cryptococcus* serotype C tested either due to low overall virulence of this strain or enhanced capacity of this strain to evade host immunity. Altogether, these studies provide "proof-of-concept" for

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OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

Comparing post-acute rehabilitation use, length of stay, and outcomes experienced by Medicare fee-for-service and Medicare Advantage beneficiaries with hip fracture in the United States: A secondary analysis of administrative data

Amit Kumar, Momotazur Rahman, Amal N. Trivedi, Linda Resnik, Pedro Gozalo, Vincent Mor

Published: June 26, 2018 • https://doi.org/10.1371/journal.pmed.1002592

Viewed

Total Article Views

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Jun 26, 2018 (publication date) through Apr 29, 2019 *

	HTML Page Views	PDF Downloads	XML Downloads	Totals
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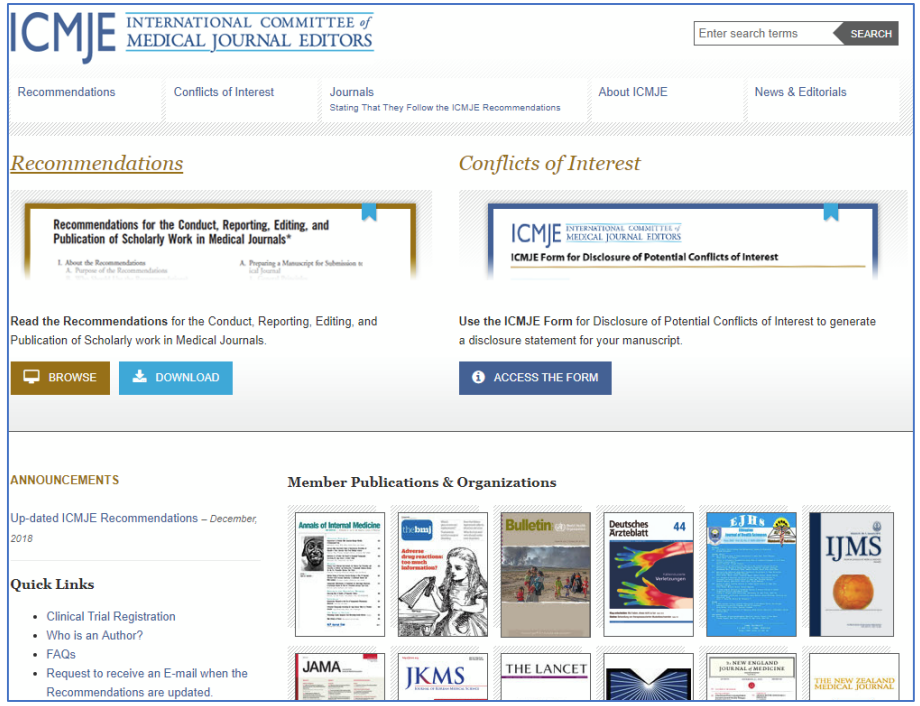
PMC	824	123	n.a.	947
Totals	5,056	2,355	835	8,246

46.58 % of article views led to PDF downloads

Attending to Journal Author Instructions

- Carefully review author instructions early in the writing process—ideally before drafting
  - Format your manuscript to align with instructions that aren't your defaults
  - If any required formatting is distracting to you, make a to-do list for changing later
  - Set reference managing software and styles in MS Word
  - Study sample articles from the journal
- Use instructions and sample articles to set up section headings and length
- Note any instructions for using additional publication or style guides
- Check for agreement between instructions on the journal or publisher's website and the manuscript submission website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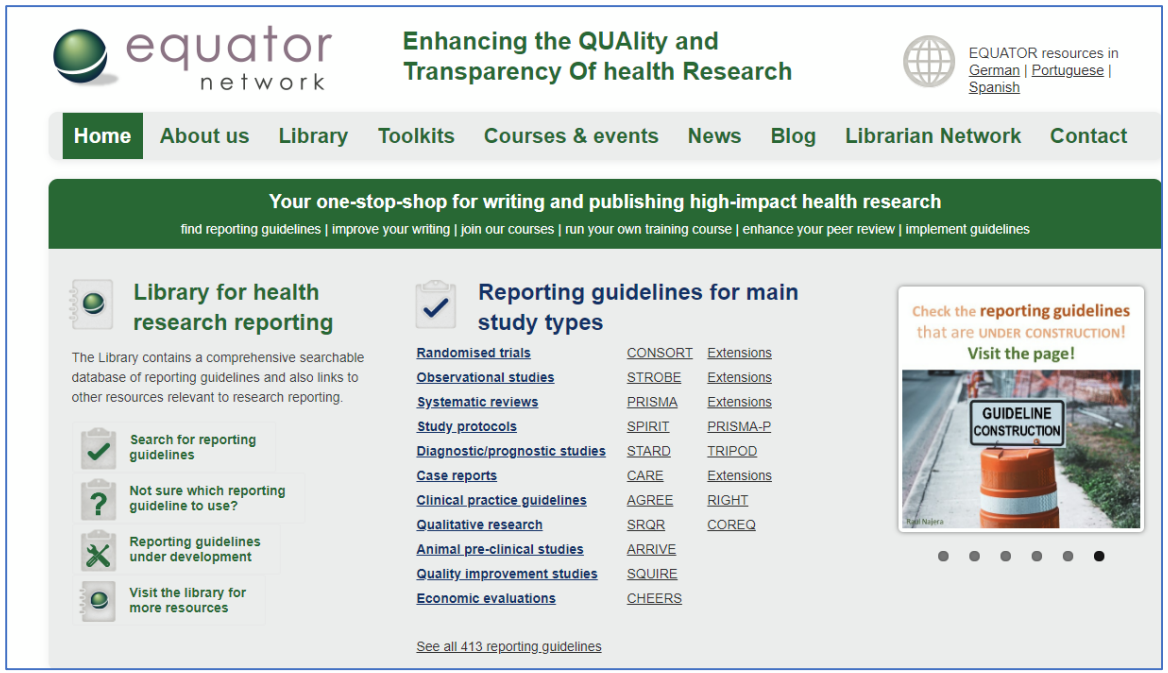
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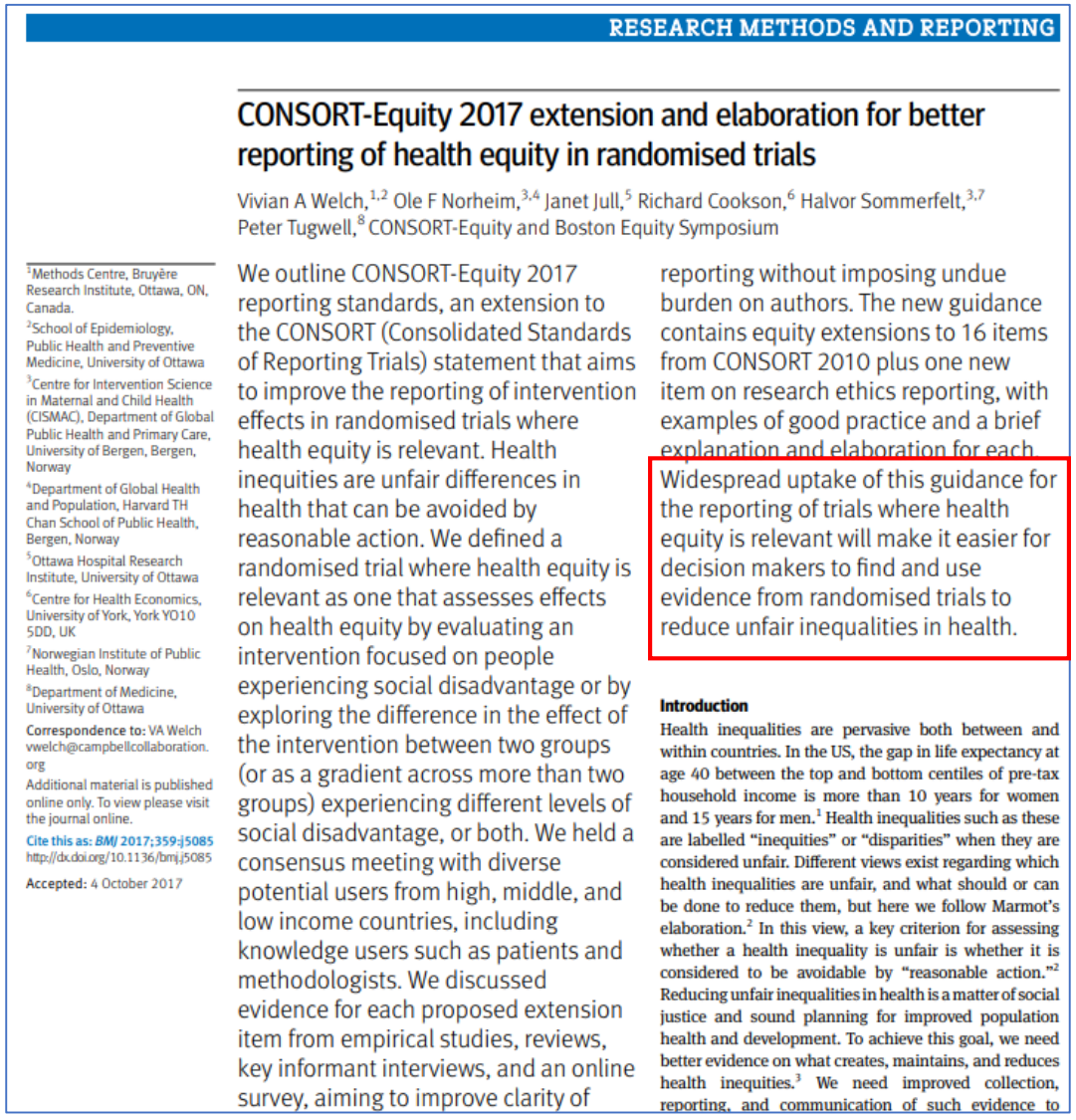
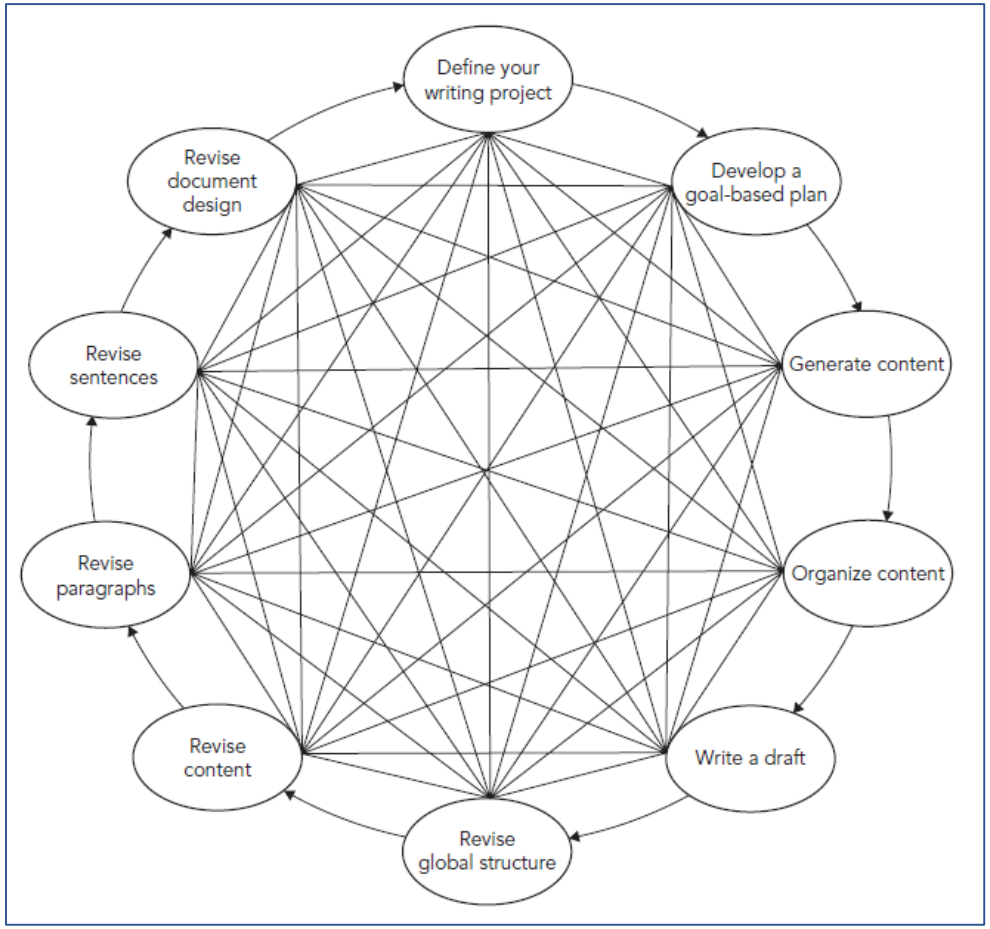

RESEARCH METHODS AND REPORTING
CONSORT-Equity 2017 extension and elaboration for better reporting of health equity in randomised trials
Vivian A Welch,[1,2] Ole F Norheim,[3,4] Janet Jull,[5] Richard Cookson,[6] Halvor Sommerfelt,[3,7] Peter Tugwell,[8] CONSORT-Equity and Boston Equity Symposium
[1]Methods Centre, Bruyère Research Institute, Ottawa, ON, Canada.
[2]School of Epidemiology, Public Health and Preventive Medicine, University of Ottawa
[3]Centre for Intervention Science in Maternal and Child Health (CISMAC), Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway
[4]Department of Global Health and Population, Harvard TH Chan School of Public Health, Bergen, Norway
[5]Ottawa Hospital Research Institute, University of Ottawa
[6]Centre for Health Economics, University of York, York YO10 5DD, UK
[7]Norwegian Institute of Public Health, Oslo, Norway
[8]Department of Medicine, University of Ottawa
Correspondence to: VA Welch vwelch@campbellcollaboration.org
Additional material is published online only. To view please visit the journal online.
Cite this as: BMJ 2017;359:j5085 http://dx.doi.org/10.1136/bmj.j5085
Accepted: 4 October 2017
We outline CONSORT-Equity 2017 reporting standards, an extension to the CONSORT (Consolidated Standards of Reporting Trials) statement that aims to improve the reporting of intervention effects in randomised trials where health equity is relevant. Health inequities are unfair differences in health that can be avoided by reasonable action. We defined a randomised trial where health equity is relevant as one that assesses effects on health equity by evaluating an intervention focused on people experiencing social disadvantage or by exploring the difference in the effect of the intervention between two groups (or as a gradient across more than two groups) experiencing different levels of social disadvantage, or both. We held a consensus meeting with diverse potential users from high, middle, and low income countries, including knowledge users such as patients and methodologists. We discussed evidence for each proposed extension item from empirical studies, reviews, key informant interviews, and an online survey, aiming to improve clarity of reporting without imposing undue burden on authors. The new guidance contains equity extensions to 16 items from CONSORT 2010 plus one new item on research ethics reporting, with examples of good practice and a brief explanation and elaboration for each
Widespread uptake of this guidance for the reporting of trials where health equity is relevant will make it easier for decision makers to find and use evidence from randomised trials to reduce unfair inequalities in health.
Introduction
Health inequalities are pervasive both between and within countries. In the US, the gap in life expectancy at age 40 between the top and bottom centiles of pre-tax household income is more than 10 years for women and 15 years for men.[1] Health inequalities such as these are labelled "inequities" or "disparities" when they are considered unfair. Different views exist regarding which health inequalities are unfair, and what should or can be done to reduce them, but here we follow Marmot's elaboration.[2] In this view, a key criterion for assessing whether a health inequality is unfair is whether it is considered to be avoidable by "reasonable action."[2] Reducing unfair inequalities in health is a matter of social justice and sound planning for improved population health and development. To achieve this goal, we need better evidence on what creates, maintains, and reduces health inequities.[3] We need improved collection, reporting, and communication of such evidence to

Using *Communication Goals* to Plan, Draft, and Revise Scientific Manuscripts

Communication goals . . .

- Are statements of intention for what you want your readers to *feel*, *believe*, *perceive*, *know*, *understand*, *think*, *agree with*, or *do*
- Are like learning (reading) objectives
- Differ from common, clichéd goals and advice
- Afford *cognitive leverage* for generating appropriate, effective content
- Are cognitive tools
- Guide fundamental expert planning, drafting, and revising processes



Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

What sublimity of mind was his who dreamed of finding means to communicate his deepest thoughts to any other person, though distant by mighty intervals of place and time!

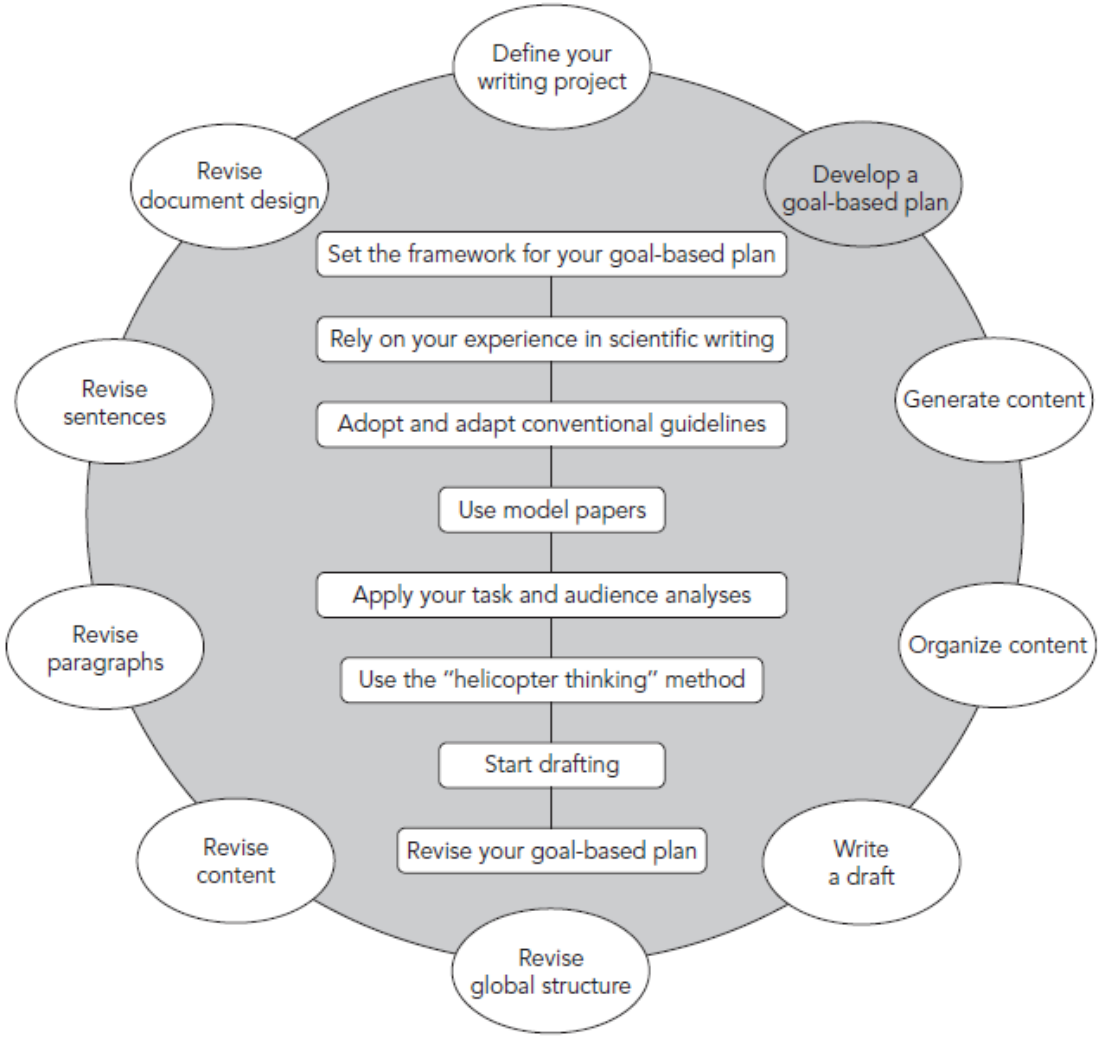
— Galileo Galilei

Communication Goals for a Job Application Letter

After reading my application letter, my readers should:

1. Agree that my education, training, and work experiences have prepared me to succeed in the position
2. Agree that I'm highly motivated for the position
3. Recognize that I understand the organization's mission, differentiators, challenges, and achievements
4. Know that I have reflected on limitations of my qualifications, but agree that my limitations are not disqualifying

How Do You Develop Effective Communication Goals?



Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

Exercise for Identifying Communication Goals in (some of your) Scientific Manuscripts

- In the following passages, ask yourselves:
  - What communication goal(s) is the writer aiming to accomplish?
  - Is the goal *appropriate* and *effective* for the manuscript section? If so, why?
  - Have you used the goal in your papers? If so, how?
- The primary aim of this exercise is *not* to evaluate the quality of the content—instead, it's to elevate your thinking *above* the content, to identify and evaluate the writer's communication goals

What are the writer's communication goals?

Passage 1 | From the introduction section

In 2010, 63,500 pregnant women in Malawi required antiretroviral (ARV) prophylaxis. Of these women, only 53% received ARVs through prevention of mother-to-child transmission (PMTCT) programs. In 2011, to expand access to treatment, the Ministry of Health in Malawi implemented Option B+, which now offers lifelong treatment to all HIV-positive pregnant women and new mothers, regardless of CD4 count.

Despite the national PMTCT scale-up, retaining women within these programs remains a challenge. Recent literature suggests that approximately 27% of PMTCT patients fail to remain in these programs. Non-adherence poses health risks for mothers and exposed infants, including possible opportunistic infections and ARV resistance; 75% adherence is necessary for ARV treatment to be effective. The present study builds on previous explorations of the social and structural barriers to adherence to examine how relations within the household, community, and clinic affect Malawian women's participation in PMTCT programs.

Elwell K. *AIDS Care*. 2016;28:971–75. [References removed]

What are the writer's communication goals?

Passage 2 | From the Introduction Section

[Government policies and programs] have created . . . incentives for acute hospitals to prioritize processes of care including the integration of early rehabilitation services.[1,2] . . . . Yet, United States hospitals do not prioritize functional recovery by providing comprehensive rehabilitation services in acute settings.[3-5] . . . .

Evidence to support the role of rehabilitation services in a patient's recovery and outcomes in acute settings is inadequate. To our knowledge, a few studies have yielded varying findings on the effect of rehabilitation services in the acute care setting on hospital readmission in patients with stroke.[3,7,8] With respect to defining rehabilitation intensity using administrative data, quantification of rehabilitation is problematic. Limitations . . . include that . . . the measure of physical therapy (PT) and occupational therapy (OT) use was based on total charges which vary regionally and are imprecise measures of cost and PT and OT treatment dose. Lack of detailed information on the amount of hospital-based OT and PT services received in prior studies using administrative data has left important gaps in understanding the relationship between rehabilitation dose during the acute stay and outcomes such as hospital readmission. The objective of this study was to use a more precise methodological approach to examine the association between the amount of hospital-based rehabilitation services received and all-cause 30-day hospital readmission in patients with ischemic stroke.

Kumar A, et al. *Arch Phys Med Rehabil*. 2019 Jan 24. Epub ahead of print.

What are the writer's communication goals?

Passage 4 | From the first paragraph of the discussion section:

While the overwhelming majority of *Cryptococcus* exposures do not progress to life-threatening illness, the ubiquitous presence of *Cryptococcus* in the environment world-wide indicates that exposure to persons predicted to be at an exceptionally high risk for developing cryptococcosis . . . is inevitable and supports the need for development of a prophylactic and/or therapeutic vaccine that provides broad-spectrum protection against multiple *Cryptococcus* serotypes. We have previously shown that mice immunized with *C. neoformans* strain H99γ, serotype A, are protected against a subsequent otherwise lethal challenge with wild-type *C. neoformans* strain H99. Herein, we demonstrate the potential for achieving broad-spectrum protection against multiple clinically relevant strains of *Cryptococcus* serotypes following vaccination with a *Cryptococcus* serotype A strain previously shown to elicit protective immunity against *C. neoformans*. Specifically, we demonstrated that mice immunized with *Cryptococcus* strain H99γ, serotype A, develop significant protection against challenge with serotypes A, B, or D of *Cryptococcus*. Our data are in line with . . . .

Van Dyke MCC, et al. *Front Immunol*. 2017;8:1359. [References removed]

What are the writer's communication goals?

Passage 5 | From the fourth paragraph of the discussion section:

Despite the higher overall hrHPV [high-risk human papillomavirus] prevalence in younger versus older women in our study, HPV-16 or 18 prevalence in women aged 21–24 years was lower than in women aged 30 to 65 years (2.0% versus approximately 7%–8%, respectively). One explanation for this finding is an effect of HPV vaccination, even though a minority of participants self-reported vaccination. However, among participants younger than 30 years who denied HPV vaccination, some may have been vaccinated during adolescence but were unaware of their status. Nonetheless, when we removed women who reported a history of vaccination from our analysis, prevalence estimates did not change significantly (see Supplementary Data). Another explanation for this finding is that the prevalence of HPV-16 and 18 among the male sexual partners of younger participants was also relatively low, thus reducing the risk of exposure to HPV-16 and 18 among these women. Future evaluations of HPV prevalence in men could further elucidate the risk of contracting hrHPV types among American Indian women.

Lee NR, et al. *J Infect Dis*. 2019;219:908-15.

Pushing the Edges of Conventions for Introduction Sections: What's the communication goal here?

From the last paragraph of the introduction to a paper on broad-spectrum vaccination against *Cryptococcus,* which causes the fungal disease*, Cryptococcosis*:

. . . the objective of these studies was to determine the potential for an anti-cryptococcal vaccine to provide broad- spectrum protection against multiple disparate *Cryptococcus* serotypes. We therefore determined the efficacy of immunization with *C. neoformans* strain H99γ to elicit protection against experimental pulmonary challenge with disparate *cryptococcal* serotypes in mice. We demonstrate that immunization with *C. neoformans* strain H99γ, serotype A, elicits a predominantly protective Th1-type immune response against challenge with different serotypes of *Cryptococcus*. These data support the premise that development of a broad-spectrum prophylactic vaccine against *cryptococcosis* is achievable.

Van Dyke MCC, et al. *Front Immunol*. 2017;8:1359.

Pushing the Edges of Conventions for Introduction Sections: What's the communication goal here?

From the last paragraph of the introduction to a paper the prevalence of high-risk human papillomavirus (hrHPV):

. . . our objective was to report the findings from the largest study of hrHPV prevalence in American Indian women (n = 698) conducted to date. Finally, because American Indian and Alaskan Native women are insufficiently sampled in national studies, we estimated the potential impact of universal vaccination in this population by evaluating the prevalence for hrHPV types relative to age for 4vHPV and 9vHPV vaccines. Future analyses will evaluate the lifestyle and behavioral risk factors for hrHPV infection from this convenience sample of American Indian women.

Lee NR et al. *J Infect Dis*. 2019;219:908-15.

Using Goals and Strategies to Structure Manuscripts

I. **Major Section 1: Introduction**
   A. Goal 1
      1. Strategy 1.1
      2. Strategy 1.2
   B. Goal 2
      1. Strategy 2.1
      2. Strategy 2.2
   C. Goal 3
      1. Strategy 3.1
      2. Strategy 3.2

II. **Major Section 2: Methods**

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

Using Goals and Strategies to Generate Content

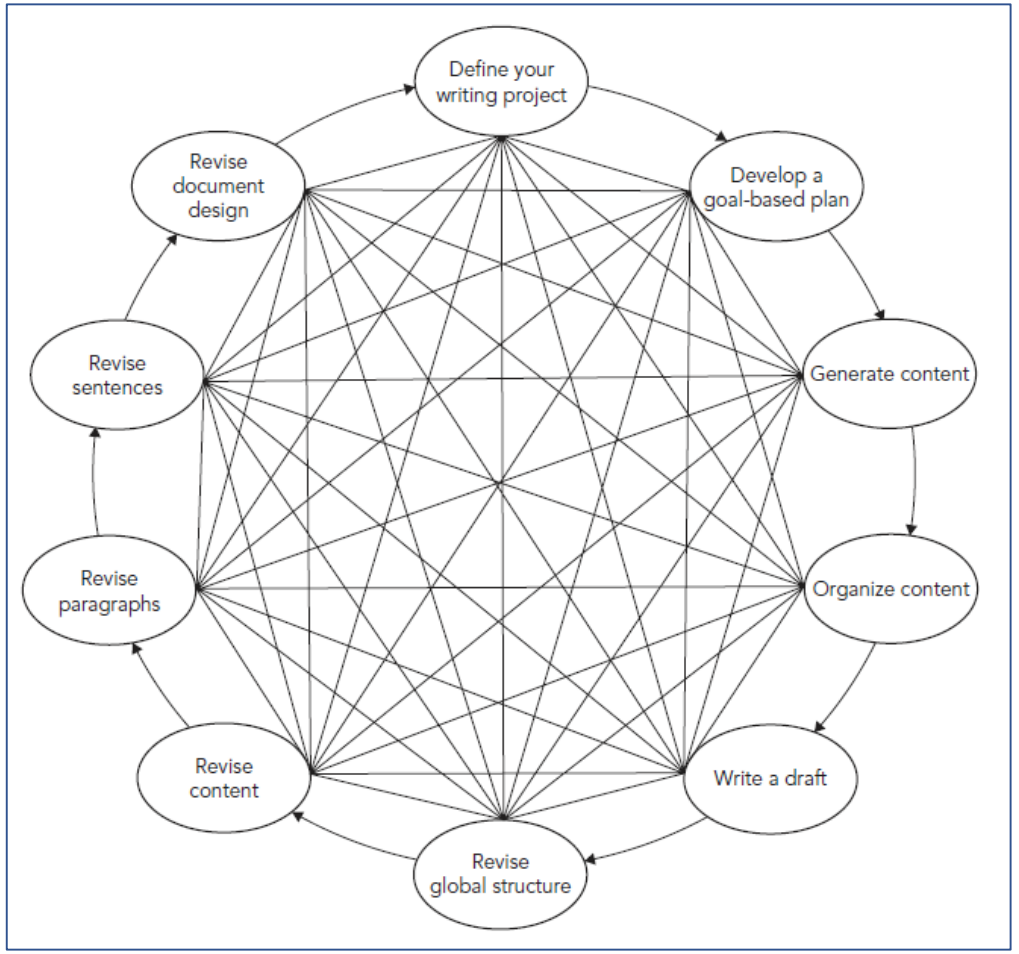
- *Communication goal: Understand and agree that my research question has not been adequately answered through previous research and that the issue is unresolved in practical settings*

Strategies:

1. *Point out that whereas many RCTs have been conducted, their findings and conclusions are not consistent—some support SMBG and some don't*
2. *Give examples of study findings on each side, to convince unresolved*
3. *Summarize the conceptual rationale on each side, to convince debatable*
4. *Present contrasting SMBG guidelines from professional societies (AACE, AADE)*

Sometimes it's necessary to go a long distance out of the way in order to come back a short distance correctly.

— Edward Albee, *The Zoo Story*



Writing Effective Paragraphs

Qualities of Well-Written Paragraphs

- Unity: 1 topic and 1 communication goal per paragraph (or maybe 2 of each at most)
- Goal-reflecting and appropriately placed topic sentences
- Alignment of each sentence's topic and goal with the paragraph's topic and goal
- Coherence: *Flow* in the logic, meaning, and patterns of ideas
- Cohesion: Surface connectives—words and phrases that promote coherence by repetition or by signaling relationships in meaning (e.g., however, moreover, thus)
- Effective organizing schemes (e.g., chronological, part-to-whole, abstract-to-concrete)
- Appropriate consistency *or* variety in the grammatical structure of successive sentences
- Alignment of the paragraph's goal with the section's and document's communication goals (document-level coherence)

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

How’s the unity?

- How quickly can you identify the **topic** and **goal**? Does the paragraph give you that sense of oneness (or, at most, twoness)?
- Do the **topics** of consecutive sentences relate logically to one another and adhere to the paragraph’s overall topic?
- Do the **goals** of consecutive sentences relate logically to one another and serve the paragraph’s overall goal?

A main aspect of self-organizing dynamical systems is that the emergence of pattern and pattern switching occur spontaneously, solely as a result of the dynamics of the system: no specific ordering influence from the outside and no homunculus-like agent or program inside is responsible for the behavior observed. Self-organizing systems are, it seems, selfless. They do not contain meaning or aspects that one would associate with meaning, such as agency, intention, will or purpose. They can appear to be goal- or end-directed, but they are not organized around goals. In fact, any hint of ‘self’ or agency is banished in physically-based theories of self-organization. Self-organization means that the system organizes itself, not that there is a self doing the organizing. So where does the self as a causal agent come from?

Kelso JAS. *Trends Cogn Sci*. 2016;20:490–9. [References removed]

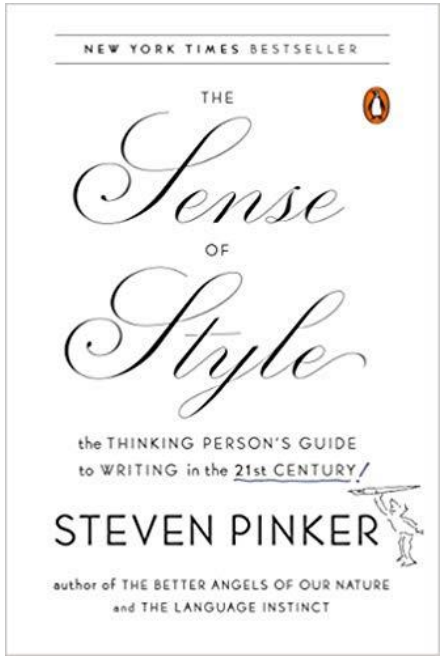
Do the sentence topics align with the paragraph topic?

Paragraph topic: Self-organizing dynamical systems

1. A main aspect of self-organizing dynamical systems is . . .
2. . . . no specific ordering influence from the outside and no homunculus-like agent or program inside is . . .
3. Self-organizing systems are . . .
4. They do not . . .
5. They can appear to be . . .
6. . . . any hint of ‘self’ or agency is . . .
7. Self-organization means . . .

Inside the writer's brain, the links between ideas are kept straight by the neural code that makes memory and reasoning possible. But out there on the page, the connections have to be signaled by the lexical and syntactic resources of the English language.

— Steven Pinker, *The Sense of Style*



How’s the coherence?

- Do you experience *flow*? If so, why?
- Do you have to re-read sentences to understand how they relate to previous sentences?
- Are there disconnects in logic (non-sequiturs) across successive sentences?
- Are there shifts in topics and goals across successive sentences?

A main aspect of self-organizing dynamical systems is that the emergence of pattern and pattern switching occur spontaneously, solely as a result of the dynamics of the system: no specific ordering influence from the outside and no homunculus-like agent or program inside is responsible for the behavior observed. Self-organizing systems are, it seems, selfless. They do not contain meaning or aspects that one would associate with meaning, such as agency, intention, will or purpose. They can appear to be goal- or end-directed, but they are not organized around goals. In fact, any hint of ‘self’ or agency is banished in physically-based theories of self-organization. Self-organization means that the system organizes itself, not that there is a self doing the organizing. So where does the self as a causal agent come from?

Kelso JAS. *Trends Cogn Sci*. 2016;20:490–9. [References removed]

Strategies for improving coherence, when you sense that it just doesn’t flow . . .

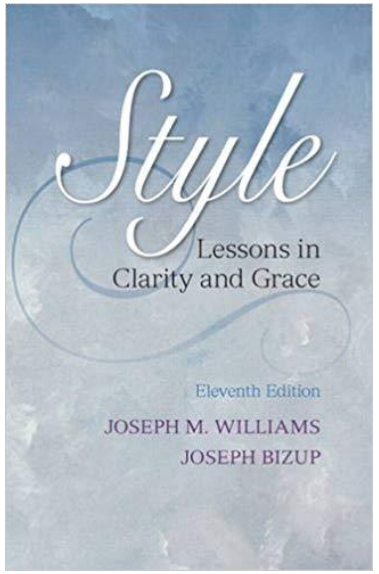
- Delete, move, or rewrite sentences that drastically shift topics and goals
- Add information, ideas, or examples to meet readers’ expectations or fill gaps in readers’ understanding
- Use transitional words and phrases as signposts and bridges to guide readers across sentences with complex ideas and relationships
- Begin new sentences with old information—that is, with words, phrases, and ideas from previous sentences
- Start all over by making a goal-directed paragraph outline

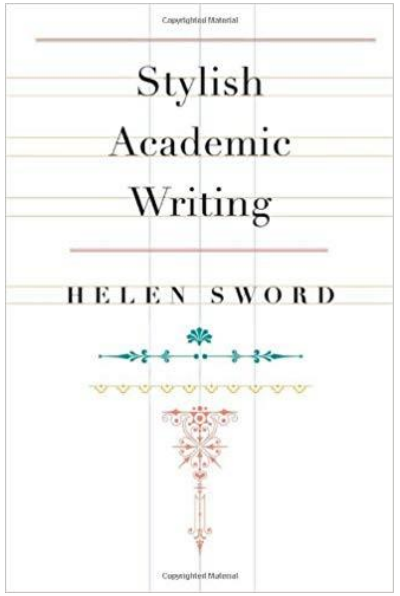
Writing Clear, Correct, and Stylish Sentences

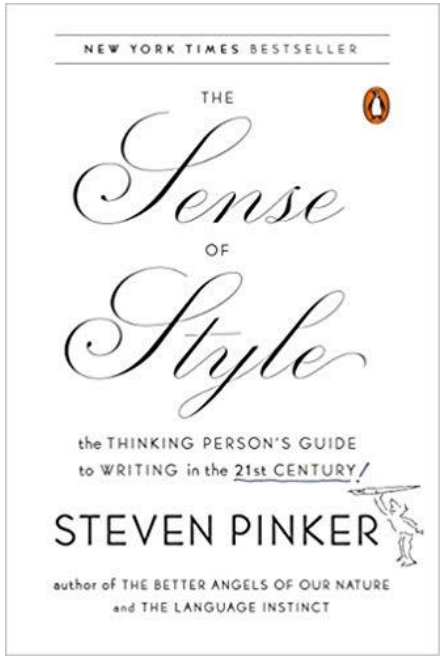
It’s All (or Mostly) About *Style*

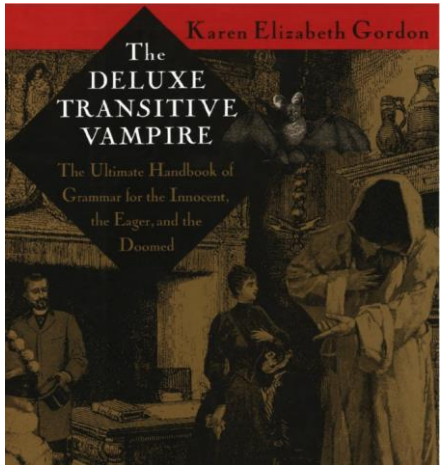
- Not so much about grammar or usage
- Not so much about *following rules*
- Cultivating good writing style is about:
  - *Designing* language to engage the reader’s mind
  - Solving problems
  - Thinking critically and creatively
  - Keeping up with how language evolves
- Cultivating good writing style is like cultivating taste for good wine

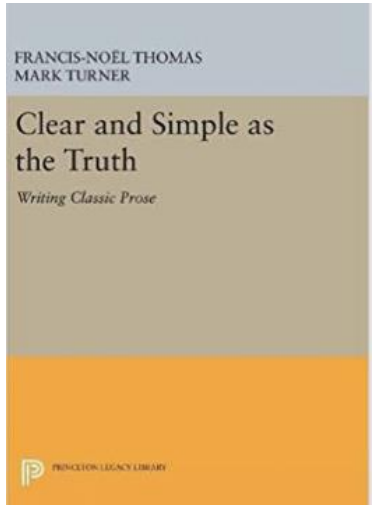
Excellent Reads on Style

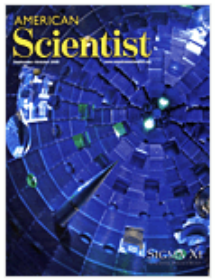








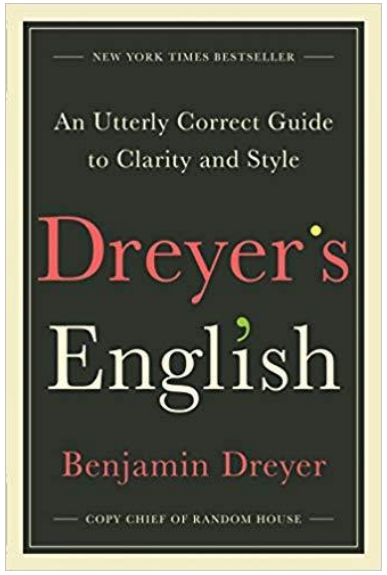




JOURNAL ARTICLE

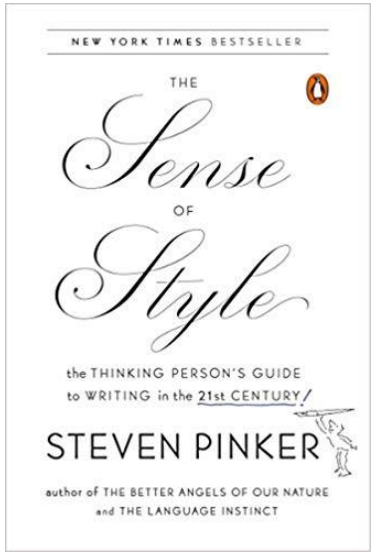
The Science of Scientific Writing

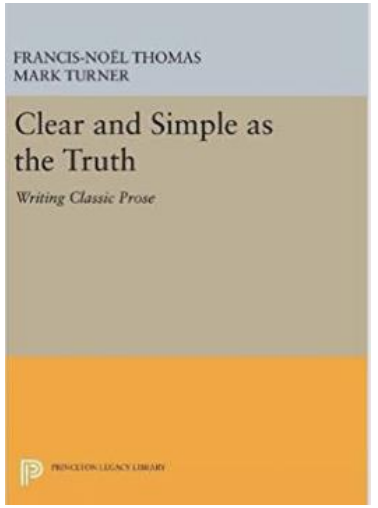
George D. Gopen and Judith A. Swan
American Scientist
Vol. 78, No. 6 (November-December 1990), pp. 550-558



Steven Pinker on Style (Mostly Verbatim)

- Style is the effective use of words to engage the human mind
- Described by Thomas and Turner as *classic* style
- Guiding metaphors of classic (engaging) style:
  - Prose as a window to the world
  - The writer training and focusing the reader's gaze
  - Story-telling in which all eyes are on a protagonist, a mover and shaker, a driving force
- Stylish writing:
  - Minimizes abstractions which cannot be seen with the naked eye
  - Uses meter and sound that resonate with meaning and mood
  - Insists on fresh wording and concrete imagery over familiar verbiage and abstract summary
  - Conveys the writer's passion about the subject
  - Makes readers feel smart





What general features describe writing style?

Passage 10 | The 1st and 3rd paragraphs from the introduction to the paper on the self-organizing origins of agency

We humans tend to believe that we are agents, masters and mistresses of our fate, that our deeds and desires are our destiny. Yet despite a sizeable literature on 'the sense of agency' and its behavioral and neuroimaging correlates, the scientific basis of causal agency and how we come to experience ourselves as agents is lacking. Agency means action towards an end. When it comes to the behavior of living things, our inability to understand end-directedness forces us to posit (often implicitly) an intelligent agent residing somewhere inside the system that is responsible for the end-directed behavior we observe. The self as causal agent remains a ghost in the machine awaiting exorcism, perhaps, by new insights from the brain and cognitive sciences. . . .

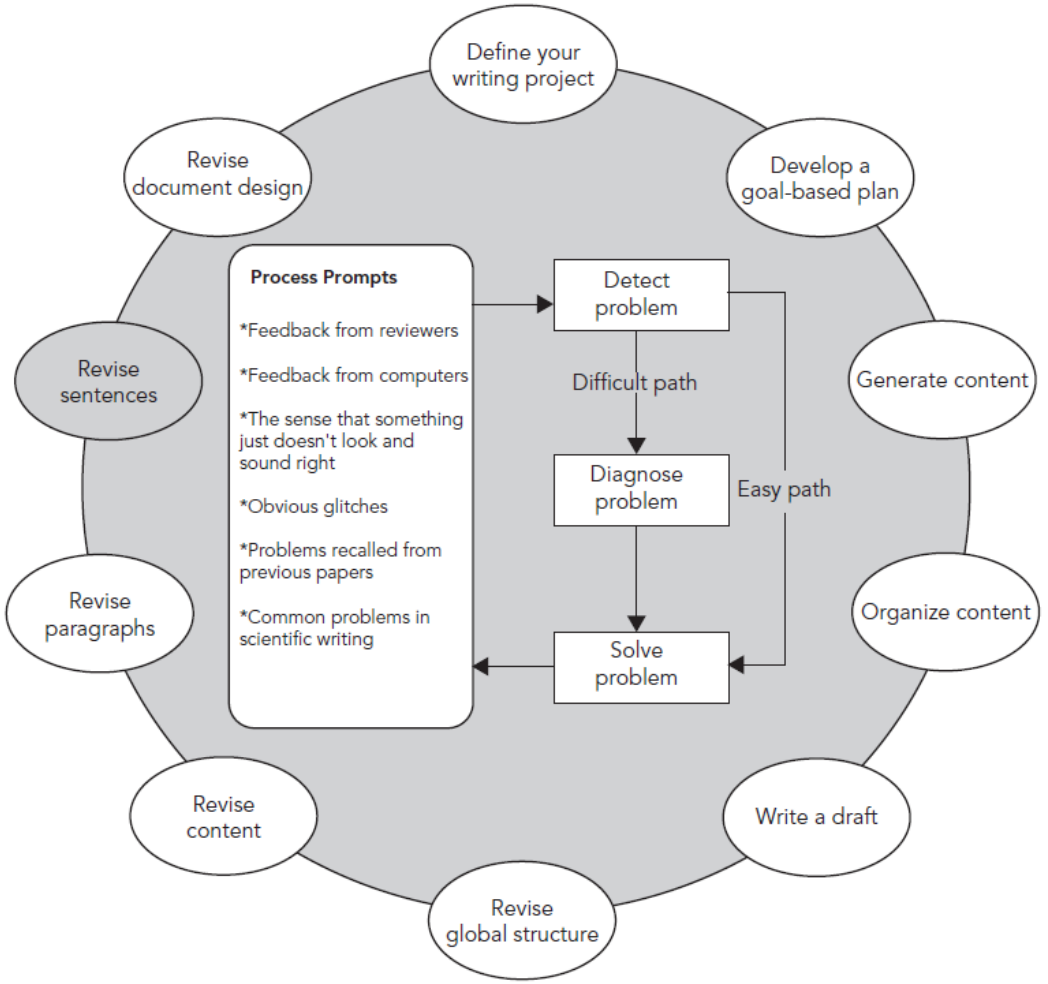
In his famous book, "What is life?," Erwin Schrödinger, one of the chief architects of quantum mechanics and the author of the famous equation that bears his name, proposed an "order from order" principle as the physical basis of life. Schrödinger speculated that this new kind of order took the form of an aperiodic crystal, later exposed as the beautiful double helical structure of the DNA molecule. Not much more was said about Schrödinger's order from order principle or his call for "new laws to be expected in the organism." Still less truck was given to the question raised by Schrödinger in the final chapter of his small book. Each of us, says Schrödinger, has the indisputable impression that the sum total of our own experience and memory is unitary and distinct from that of any other person. We humans, for example, have no doubt whatsoever that it is us, and us alone, who direct the motions of our own bodies and foresee its effects. *What is this 'I'?* (italics his) Schrödinger asks, like a voice crying out of the wilderness. Here I ask: Where do agency and directedness come from? How does the self as a causal agent come about?

Kelso JAS. *Trends Cogn Sci*. 2016;20:490–9. [References removed]

Key Sentence-Level Problems to Solve

- Lack of accuracy, clarity, and precision in words and phrases
- Illogical expressions
- Excessive and unnecessary abstraction
- Disadvantageous positioning of words, phrases, or clauses
- Unfit or lackluster subjects and verbs
- Excessive separation of subjects and verbs
- Confused uses of active or passive voice
- Inflated language
- Inappropriate or missing punctuation

Revising sentences is a cognitively demanding activity



Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

. . . the view of the world being analogous to a huge machine, the predominant view from the sixteenth to nineteenth centuries, is now shown to be only approximately correct. The underlying structure of matter, however, is not mechanical. This means that the term "quantum mechanics" is very much a misnomer. It should, perhaps, be called "quantum nonmechanics.”

— David Bohm

Which words and phrases may lack *clarity* and *precision?*

- During sleep deprivation, exposure to bright light modifies melatonin secretion.
- Sleep deprivation can stunt bone growth in children, but it is unknown whether this effect is caused by negative influences on growth hormone.
- Sleep deprivation can stunt bone growth in children, but it is unknown whether this effect is caused by diminished secretion of growth hormone.
- This study showed that the degree of atrophy in the medial prefrontal cortex appeared to be a significant correlate of slow-wave sleep and declarative memory consolidation.
- More pronounced atrophy in the medial prefrontal cortex was correlated with less time in slow-wave sleep and worse memory.
- Older adults with more pronounced atrophy in the medial prefrontal cortex spent less time in slow-wave sleep and performed worse on memory tests.

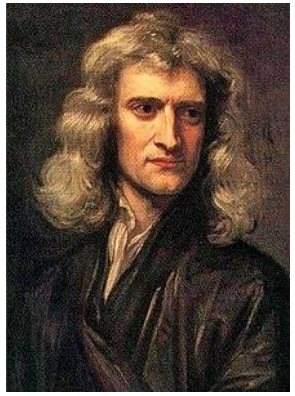
Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

Illogical Expressions

- Sleep apnea is a disease where breathing stops for periods of 10 seconds or longer during sleep.
- Sleep apnea is a disease in which breathing stops for periods of 10 seconds or longer during sleep.
- Concerning the effects of exogenous melatonin on sleep quality, our conclusion differs from Moore and Willis (2015).
- Concerning the effects of exogenous melatonin on sleep quality, our conclusion differs from that of Moore and Willis (2015).
- The three sleep deprivation conditions had significantly different scores on the vigilance test.
- Participants assigned to the three sleep deprivation conditions had significantly different scores on the vigilance test.
- The present study asked whether sleep deprivation impairs immune function.
- We asked whether sleep deprivation impairs immune function.

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

I have not yet been able to deduce from phenomena the reason for these properties of gravity, and I do not feign hypotheses.



I have called this principle, by which each slight variation, if useful, is preserved, by the term of Natural Selection, in order to mark its relation to man's power of selection.

We wish to suggest a structure for the salt of deoxyribose nucleic acid. This structure has novel features which are of considerable biological interest.

Illogical Expressions: Dangling Modifiers

- After ingesting 200 mg of caffeine, the researchers found that cognitive performance was maintained at a high level in sleep-deprived subjects.
- After ingesting 200 mg of caffeine, the sleep-deprived subjects maintained their high level of cognitive performance.
- When comparing the sleep-deprived groups and the control group, depression scores were highest for subjects who slept fewer than 6 hours a night.
- When comparing the sleep-deprived groups and the control group, the researchers found that depression scores were highest for subjects who slept fewer than six hours a night.
- Daytime secretion of interleukin-6 increases when deprived of REM sleep.
- Daytime secretion of interleukin-6 increases when mice are deprived of REM sleep.
- To determine the effects of caffeine on mental alertness, the data were analyzed with a t-test.
- To determine the effects of caffeine on mental alertness, I analyzed the data with a t-test.

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

About *Abstract* Versus *Concrete* Language

- Abstract words and phrases refer to things that we can't directly sense
- To varying degrees, all language is abstract
- Good science requires abstraction
- Whereas abstract language can sometimes facilitate effective communication, excessive and unnecessary abstractions are problematic
- Abstract writing may arise from the *curse of knowledge:* The difficulty of imagining that someone doesn't know what you know

Nominalizations (*zombie* nouns) are a type of abstraction

Verb	Zombie noun with an added suffix, like –ment, –ity, –tion, –ence, –ism, or –ance
assign	assignment
investigate	investigation
perform	performance
differ	difference
discuss	discussion
recruit	recruitment

Google Helen Sword on *zombie nouns*

Bringing Zombie Nouns to Life

- The assignment of study participants to groups was implemented according to random procedures.
- Study participants were randomly assigned to groups.
- We carried out an investigation of the effects of exercise on memory.
- We investigated the effects of exercise on memory.
- We sought to determine whether there was a difference between the 2 diets in terms of the study participants' weight loss.
- We sought to determine whether weight loss differed between participants on the 2 diets.

Do these sentences differ in their messages and meaning? If so, how and why?

1. In the youngest subjects, muscle cramps during sleep were caused by dehydration.
2. In the youngest subjects, dehydration caused muscle cramps during sleep.
3. Dehydration caused muscle cramps during sleep in the youngest subjects.

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

Disadvantageous Positioning of Words, Phrases, or Clauses

- Monoclonal antibodies that target TNF-a are effective treatments for immune-mediated inflammatory diseases, and were first approved by the FDA in the late 1990s.
- First approved by the FDA in the late 1990s, monoclonal antibodies that target TNF-a are effective treatments for immune-mediated inflammatory diseases.
- Concerns among healthcare providers and patients about safety and effectiveness, uncertainties about evolving statutory and regulatory guidance, and financial disincentives related to reimbursement are the main barriers to adoption of biosimilar therapies for immune-mediated inflammatory diseases.
- The main barriers to adopting biosimilar therapies for immune-mediated inflammatory diseases are concerns among providers and patients about safety and effectiveness, uncertainties about evolving statutory and regulatory guidance, and financial disincentives related to reimbursement.

Unfit or Lackluster Subjects and Verbs

- Our finding that norepinephrine regulates REM sleep is in agreement with results from previous research.
- Our finding that norepinephrine regulates REM sleep agrees with results from previous research.
- Measurements of the activity of serotonergic neurons were taken before the subjects received treatments for restless leg syndrome.
- Serotonergic neuronal activity was measured before the subjects received treatments for restless leg syndrome.
- To meet energy demands for muscle contraction, the replenishment of ATP is accomplished through the metabolism of carbohydrate, fat, and protein.
- To meet energy demands for muscle contraction, ATP is replenished through the metabolism of carbohydrate, fat, and protein.
- An explanation of paradoxical sleep may have been provided if a closer examination of the shape of EEG waveforms had been conducted.
- Paradoxical sleep may have been explained if the shape of EEG waveforms had been closely examined.

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

Excessive Separation of Subjects and Verbs

- The role of GLP-1 agonists in the treatment of type 2 diabetes have been shown to be viable options for add-on therapy in diabetic patients, as well as potential monotherapy options.
- Our results revealed in the present study of a progressive decline in alertness and cognitive performance in subjects who were deprived of sleep, indicated in the data showing that vigilance deteriorated over the 48 hours of testing agrees with those from previous studies.
- We found that alertness and cognitive performance progressively declined in sleep-deprived subjects, as indicated in the data showing that vigilance deteriorated over the 48 hours of testing. Our results agree with those from previous studies.
- The pattern by which college students deprive themselves of sleep during the week in order to study and participate in social events and then catch up by sleeping an excessive number of hours on the weekends disrupts the normal circadian rhythm.

Should scientific manuscripts be written in *active* voice or *passive* voice?

What's the Difference Between Active and Passive Voice?

- In active voice, the subject–verb unit names the agent or actor of the verb:
  - For the baseline and post-education periods, as part of a larger analysis of electronic medical records (EMRs) of the physicians' HF patients, we conducted directed content analysis of EMR progress notes.
- In passive voice, the subject–verb unit does *not* name the agent or actor of the verb:
  - Directed content analysis of HF patients' electronic medical records (EMR) progress notes was completed at baseline (n=300) and post-education (n=300) to assess documented performance (yes/no) of 5 SDM skills.

When should you use active vs passive voice? It depends . . .

Situation	Use Active	Use Passive	Some Examples
When editors or reviewers indicate a preference for active	•		
When passive adds unnecessary words and dulls the tone	•		**Problem**: Monoamine oxidase inhibitors have been known to be an effective treatment for narcolepsy. **Solution**: Monoamine oxidase inhibitors effectively treat narcolepsy.
When passive (1) creates ambiguity about who did what or (2) shirks responsibility	•		**Problem**: In efforts to control for confounding variables that could have influenced sleep quality, exercise and dietary factors were overlooked. **Solution**: In efforts to control for confounding variables that could have influenced sleep quality, we overlooked exercise and dietary factors.
When active inappropriately indicates that the actor is more important than the object acted on		•	**Problem**: Researchers use polysomnography to evaluate the severity of sleep-disordered breathing. **Solution**: Polysomnography is used to evaluate the severity of sleep-disordered breathing.
When active overloads with distracting first-person references		•	**Problem**: We recruited . . . We randomized . . . We measured . . . We analyzed . . . . We
When active constructions weaken paragraph coherence		•	

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

Inflated Language: Unnecessary Syllables, Words, and Jargon

- Individuals afflicted by the persistent condition of anti-somnolence are advised to conform to parameters that incorporate the application of periodic and systematic physical exertion and the attenuation of disturbances in the homeostasis of mental states.
- People who cannot sleep should exercise regularly and reduce their stress.
- We utilized chi-square tests to assess . . .
- We used chi-square tests to assess . . .
- In the study conducted by Garcia and Newman (2003), it was canonically found that the percentage of slow wave sleep undergoes a decrease with age, and slow waves are thought to help orchestrate hippocampal-neocortical dialogue that supports systems level consolidation.
- Garcia and Newman (2003) found that time in slow wave sleep decreases with age and that slow waves facilitate hippocampal-neocortical interactions that consolidate memory.

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

TABLE 7.2 **Examples of Wordy Phrases and Concise Revisions**

Wordy	Concise
a considerable number of	many
a great majority of	most
-accounted for by the fact that -due to the fact that -for the reason that -in view of the fact that -on the grounds that	because
a plethora of	many
a total of 64 subjects	64 subjects
along the lines of	like
are of the same opinion	agree
as a means of	to
as of the current date	now, today
as to whether	whether
at the present time	now
because of the fact that	because
blue in color	blue
by means of	By
causal factor	cause
despite the fact that	although

TABLE 7.2 **Continued**

it goes without saying that	(omit)
it has long been known that	(could omit)
it is evident that	(omit)
it is of interest to note that	note that (or omit)
in the course of	during
in the event that	if
made note of	noted
made reference to	referred to
of the opinion that	think that
on a daily basis	daily
on the basis of	by
performed a study of	studied
place a major emphasis on	emphasize
prior to	before
referred to as	called
so as to	to
subsequent to	after
take into consideration	consider
the reason why is because	the reason is that
through the use of	by
whether or not	whether

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

TABLE 7.3 **Examples of Unnecessary Jargon and Plain-English Revisions**

Unnecessary jargon	Plain-English revision
ameliorate	improve
apprise	inform
causal factor	cause
commence	begin
component	part
dialogue (verb)	talk
effectuate	cause
elucidate	explain
employ	use
endeavor	try
eventuate	happen
evidenced	showed
fabricate	make
finalize	finish, end
impact (verb)	affect, influence
implement (verb)	apply
initiate	start
quantitate (verb)	count
terminate	end
transpire	occur
utilize, utilization	use

Greene, L. *Writing in the Life Sciences: A Critical Thinking Approach*. Oxford University Press. 2010.

Writing Introduction Sections to Research Papers, Review Papers, and Book Chapters

Using Communication Goals and Strategies to Generate, (Peer) Review, and Revise Content

Part of a goal-based plan for the introduction to a manuscript reporting a randomized clinical trial (RCT) on the effects of self-monitoring of blood glucose (SMBG) on hemoglobin A1c in people with noninsulin-treated type 2 diabetes (T2D) in primary care settings

Communication goal: Understand and agree that my research question has not been adequately answered through previous research and that the issue is unresolved in practical settings

Strategies:

1. *Point out that whereas many RCTs have been conducted, their findings and conclusions are not consistent—some support SMBG and some don't*
2. *Give examples of study findings on each side, to convince unresolved*
3. *Summarize the conceptual rationale on each side, to convince debatable*
4. *Present contrasting SMBG guidelines from professional societies (AACE, AADE)*

What are *your* communication goals for introduction sections of IMRAD-formatted research papers or review papers?

1.

Communication Goals for Introduction Sections

- Accurately state the *core* research question(s) or problem(s) that motivated your study, review paper, or book chapter
- Understand and summarize the supporting backstory and "side stories" for your research question
- Understand and agree that your research question has not been adequately answered through previous studies and/or that the issue remains unresolved in practical, societal, or natural settings
- Understand and agree about the importance and value of answering your research question
- Understand and agree that your approach to answering the research question is innovative and valuable, addressing shortcomings of previous studies
- Know how and agree that your study addresses the interests and needs of the journal's readership
- Accurately state your study purposes and understand their supporting rationale
- Accurately state your study hypothesis and understand its supporting rationale

Using Communication Goals and Strategies to Structure Manuscripts

I. **Major Section 1: Introduction**
   A. Goal 1
      1. Strategy 1.1
      2. Strategy 1.2
   B. Goal 2
      1. Strategy 2.1
      2. Strategy 2.2
   C. Goal 3
      1. Strategy 3.1
      2. Strategy 3.2

II. **Major Section 2: Methods**

Goal: Accurately state the core research question that motivated your study, review paper, or book chapter—and understand the supporting backstory and side stories

- It's the most fundamental communication goal in all of scientific writing
- It's like leading your readers on a ***video tour*** of a Humphrey's Peak hike
  - The peak is your research question or problem
- Best to present the research question or problem *explicitly* and *early*
- Poses challenges of figuring out:
  - How/where to start
  - What information and ideas readers will need
- Affords opportunities to inspire readers' curiosity and engagement

Steven Pinker on the Typical Start of an Academic Paper

Writers live in two universes. One is the world of the things they study . . . The other is the world of their profession: getting articles published, going to conferences, ... Most of a researcher's waking hours are spent in the second world, and it's easy for him to confuse the two. The result is the typical opening of an academic paper:

> In recent years, an increasing number of psychologists and linguists have turned their attention to the problem of child language acquisition. In this article, recent research on this process will be reviewed.

No offense, but very few people are interested in how professors spend their time. Classic style ignores the hired help and looks directly at what they are being paid to study:

> All children acquire the ability to speak a language without explicit lessons. How do they accomplish this feat?

— Steven Pinker, *The Sense of Style*

American Psychological Association

Journal of Experimental Psychology: General

0096-3445/19/$12.00

2019, Vol. 148, No. 1, 158–173
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Maimonides' Ladder: States of Mutual Knowledge and the Perception of Charitability

Julian De Freitas
Harvard University

Peter DeScioli
Stony Brook University

Kyle A. Thomas
MotiveMetrics, Palo Alto, California

Steven Pinker
Harvard University

Why do people esteem anonymous charitable giving? We connect normative theories of charitability (captured in Maimonides' Ladder of Charity) with evolutionary theories of partner choice to test predictions on how attributions of charitability are affected by states of knowledge: whether the identity of the donor or of the beneficiary is revealed to the other. Consistent with the theories, in

People tend to judge donors who give anonymously as more charitable and generous than those who give publicly. This conventional wisdom is the basis for an episode of the TV comedy *Curb Your Enthusiasm* in which Larry David donates money for a wing of a nonprofit building that is named after him and is chagrined to find that his rival, Ted Danson, donated money for the other wing anonymously while his identity leaked out, paradoxically reaping him the reputational advantages of both the gift and the anonymity. In experiments (Critcher & Dunning, 2011; Lin-Healy & Small, 2013; Newman & Cain, 2014) and in real life, people often criticize donors who seek too much credit for their beneficence, as seen in the outrage directed at two philanthropists who rescinded a $3 million gift to a zoo because the plaque showing their names was too small (Dunlap, 1997).

The perceived merit of anonymous gifts is more than an abstract issue of normative ethical judgment. In modern times, charitable institutions are increasingly charged with solving some of the world's most complex humanitarian problems, including hunger, disease, natural disasters, economic development, and political instability. A society's collective choices about which gifts to praise, reward, and encourage can affect the flow of resources to these urgent problems. For instance, Dan Pallotta organized fund-raising events like AIDSRides and Breast Cancer-3-Days that raised $305 million for charities. But his companies collapsed after complaints that they earned a profit. Pallotta said, wistfully, "People continue to die as a result . . . This we call morality" (Pallotta, 2009).

Why do people care so much about a donor's anonymity, recognition, or ulterior benefits? None of this has anything to do with how much a donation improves beneficiaries' well-being. Why not embrace donors' desires for recognition as a win–win opportunity to increase charitable giving?

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Julian De Freitas, Department of Psychology, Harvard University; Peter DeScioli, Department of Political Science, Stony Brook University; Kyle A. Thomas, MotiveMetrics, Palo Alto, California; Steven Pinker, Department of Psychology, Harvard University.

For helpful suggestions, we thank Kurt Gray and Jason Nemirow.

Correspondence concerning this article should be addressed to Julian De Freitas, Department of Psychology, Harvard University, William James Hall 964, 33 Kirkland Street, Cambridge, MA 02138. E-mail: defreitas@g.harvard.edu

Raising an Active and Healthy Generation: A Comprehensive Public Health Initiative

Russell R. Pate and Marsha Dowda
Department of Exercise Science, University of South Carolina, Columbia, SC

Key Points

- Physical activity provides important health benefits to children and adolescents, but most American youth do not meet current physical activity guidelines.
- A comprehensive public health initiative is needed to increase population-level youth physical activity, and it should include evidence-based strategies applied in multiple societal sectors.
- Established public health methods should be used in implementing policies and programs that will change U.S. communities in ways that will increase physical activity in young people.

INTRODUCTION

For well over a century, multiple professional groups in the United States have worked to promote physical activity (PA) and physical fitness in youth. In the late 19th century, based largely on the recommendations of highly regarded physicians, the American educational system established and ultimately institutionalized physical education for students (1). In the mid-20th century, President Eisenhower, concerned by a report that American children were less physically fit than their European counterparts, established a President's Council on Youth Fitness. Eisenhower's successor, John F. Kennedy, broadened the role of the Council to include promotion of physical fitness in all segments of the population, but maintained an emphasis on youth. In addressing a Conference on Physical Fitness in Youth in 1961, Kennedy said, "I want to urge that this be a matter of great priority. 'A sound mind and a sound body' is one of the oldest slogans of the Western World. I am hopeful that we will place a proper weight on intellectual achievement, but in my judgment, for the long-range happiness and well-being of all of you, for the strengthening of our country, for a more active and vigorous life, all of you as individuals and as groups will participate in strengthening the physical well-being of young American boys and girls."

In retrospect, President Kennedy's words have an ironic ring, given that American children of the 1960s were almost certainly more physically active and fit than are today's children (2,3). Because public health surveillance systems did not include measures of PA in the 1960s, we cannot be certain of the extent to which PA levels in youth have declined over the past 60 yr. But what is certain is that, today, millions of American children are less physically active and fit than experts recommend (4,5). It is also certain that a substantial public health burden is associated with low PA in youth and that this burden includes rates of overweight and obesity that have skyrocketed over the past 30 yr (6,7).

This article is based on the premise that, for the United States and most economically developed nations, promotion of PA in children and youth constitutes one of the great public health challenges of the 21st century. Our primary purpose in this article is to lay out a comprehensive plan that we believe has the potential to meet that challenge. The plan is composed of specific strategies for which both evidence supporting intervention effectiveness and experience with implementation in large-scale applications exist. The selected strategies are applied across multi-

Address for correspondence: Russell R. Pate, Ph.D., Department of Exercise Science, Arnold School of Public Health, University of South Carolina, Columbia, SC 29208 (E-mail: RPATE@mailbox.sc.edu).
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Pate RR, Dowda M. *Ex Sport Sci Rev*. 2019; 47:3-14.

Common Pitfalls and Problems in Leading Readers to Research Questions

- Lengthy, detailed, and/or inert background information (versus *backstory*)
- Background information that readers will likely already know
- Missing or confusing research questions or problems
- Underdeveloped, unclear, or confusing backstory

Goal: Agree that your research question has not been adequately answered or that the issue remains unresolved in practical, societal, or natural settings

- Addresses key questions that readers will ask: Is the research question really unanswered? Is the problem really unsolved? Why can't we just rely on the results and conclusions of previous studies?
- May require making a well-rounded scientific argument
- Content depends on the reasons that your question has not been adequately answered:
  - Insufficient knowledge due to gaps in previous studies
  - Conflicting results, conclusions, and/or arguments from previous studies
  - Conflicting practices in society or conflicting events or phenomena in nature
  - Methodological inconsistencies or limitations of previous studies
- Also especially important for grant proposals

Goal: Understand and agree about the importance and value of answering your research question

- Addresses readers' question, "Why should we care?"
- Strategies may involve:
  - Describing underlying problems and their implications in science, society, or nature
  - Presenting evidence to convince readers about the importance and value
  - Describing *who* or *what* is affected and *how*
  - Showing readers the potential benefits of answering your research question
  - Showing readers the consequences of the question remaining unanswered
- Decisions about whether and how to use this goal depend on readers' beliefs and knowledge
  - Avoid stating the obvious or understating what readers need
- The content sets up a key communication goal for the discussion section
- Also especially important for grant proposals

Goal: Understand and agree that your approach to answering the research question is innovative and valuable, addressing shortcomings of previous studies

- Addresses readers' key questions: How does your study add to or advance research in the field? What makes your study exceptional?
- The content you generate depends on what is unique about your study:
  - Demographics or characteristics of participants
  - Environmental conditions
  - Methods, technologies, or analyses
- Essential part of the research design process: Determined long before drafting your manuscript!
- Also a key goal for grant proposals

Goal: Know how your study addresses the interests and needs of the journal's readership

- Key consideration for journal editors
- Requires knowing the journal’s mission, focus, and associations with professional organizations
- May involve referring directly to recently published articles in the journal
- Should involve citing previous related articles published in the journal

Writing Methods Sections

Communication Goals for Methods Sections

- Get the gist of, *or* describe in detail, *or* precisely replicate your study's design and methods
- Understand and agree with how you used key methods to:
  - Answer specific aspects of your research question
  - Achieve your study purposes
  - Test your hypotheses
- Agree that your methods are accurate, valid, reliable, and/or innovative

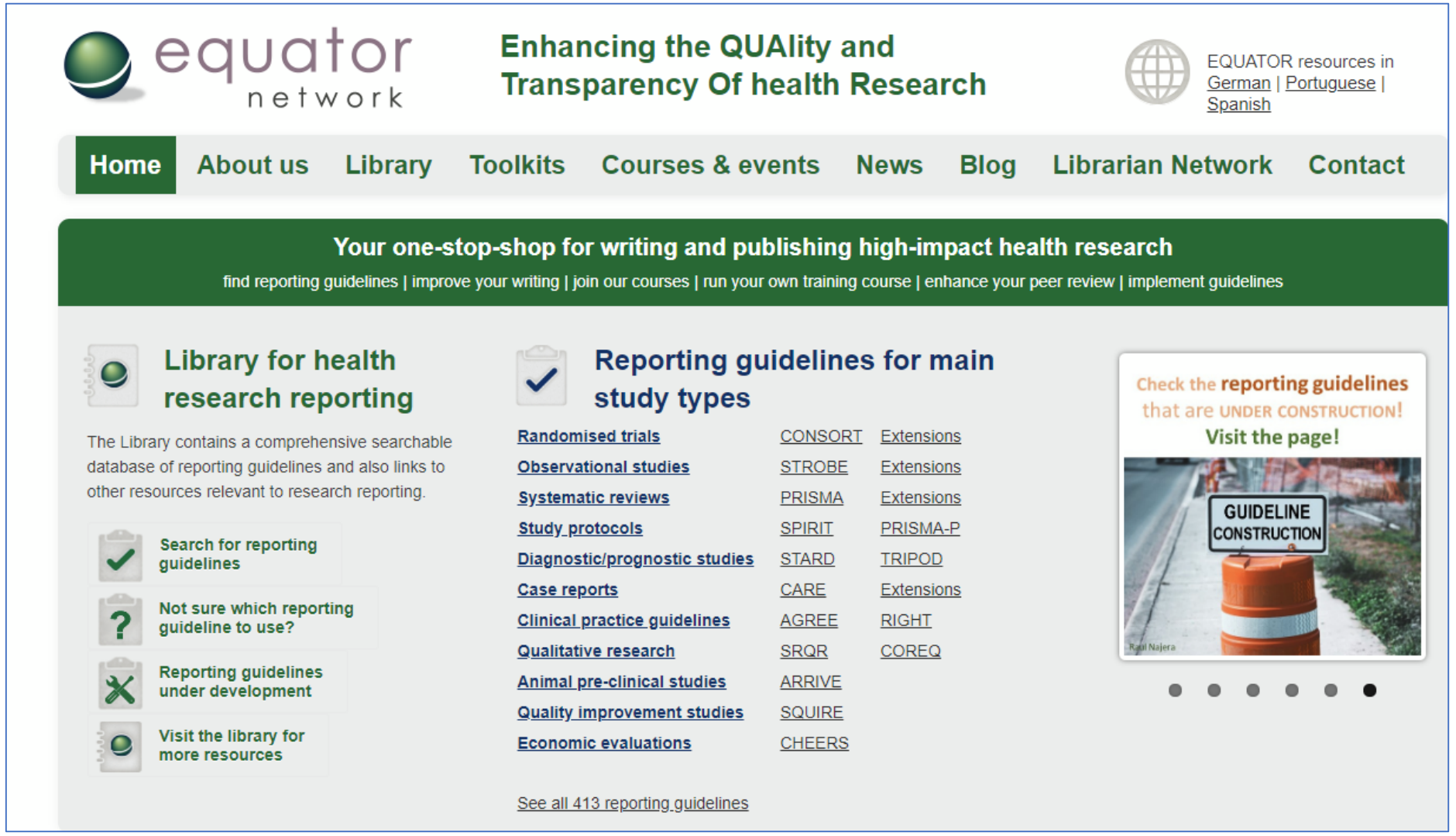
Goals: Get the gist of, *or* describe in detail, *or* precisely replicate your study's design and methods

- Which goal you use depends on:
  - The complexity of your design and methods
  - Needs for researchers to reproduce your study and validate its findings
  - Needs for practitioners to implement your study's methods
  - Journal instructions, conventions, and constraints on space
- Main challenges include:
  - Ordering the methods logically, to address readers' needs and expectations
  - Providing just the right amount of detail and explanation
- Style matters!
- It's sort of like giving your readers of video tour of how you *prepared* for your hike to Humphrey's Peak

Example Ordering Schemes for Methods Sections

- Examples of ordering schemes:
  - By research questions or aspects of a single research question
  - By study purposes or hypotheses
  - Chronological narrative
  - Whole-to-part or part-to-whole
- Which scheme to choose depends on your research question and type of study/design—for example:
  - Epidemiological
  - Randomized controlled trial
  - Quality improvement
  - Implementation science
  - Systematic review or meta-analysis

Publication Guidelines that Inform Methods Sections

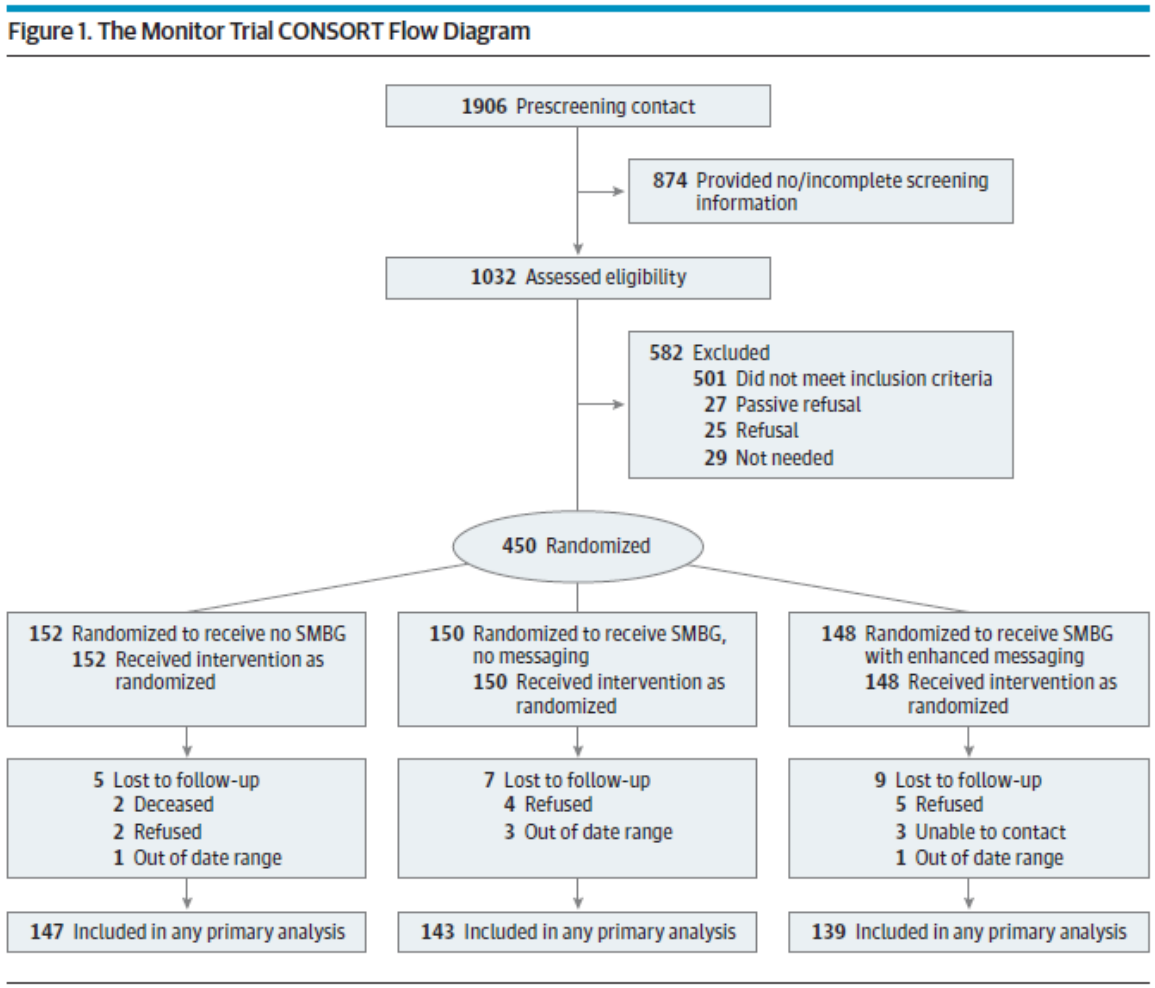


Example of SQUIRE for Quality Improvement Studies

SQUIRE | SQUIRE 2.0 Guidelines | About SQUIRE | SQUIRE Translations | QIKAT | News and Events | SQUIRE Friendly Journals

Methods	*What did you do?*
7. Context	Contextual elements considered important at the outset of introducing the intervention(s)
8. Intervention(s)	a. Description of the intervention(s) in sufficient detail that others could reproduce it b. Specifics of the team involved in the work
9. Study of the Intervention(s)	a. Approach chosen for assessing the impact of the intervention(s) b. Approach used to establish whether the observed outcomes were due to the intervention(s)
10. Measures	a. Measures chosen for studying processes and outcomes of the intervention(s), including rationale for choosing them, their operational definitions, and their validity and reliability b. Description of the approach to the ongoing assessment of contextual elements that contributed to the success, failure, efficiency, and cost c. Methods employed for assessing completeness and accuracy of data
11. Analysis	a. Qualitative and quantitative methods used to draw inferences from the data b. Methods for understanding variation within the data, including the effects of time as a variable
12. Ethical Considerations	Ethical aspects of implementing and studying the intervention(s) and how they were addressed, including, but not limited to, formal ethics review and potential conflict(s) of interest

CONSORT Flow Diagram for an RCT on SMBG



Young LA, et al. *JAMA Intern Med.* 2017;177:920-9.

Goal: Understand and agree with how you used key methods to answer key aspects of your research question . . . purposes, hypotheses

- Avoids the major problem of *laundry lists* of methods that aren't clearly related to research questions, purposes, and hypotheses
- May require reorienting readers to specific aspects of your research question or your study purpose or hypothesis
- Requires language like:
  - *To assess the effects of regular SMBG on health-related quality of life, we used . . .*
  - *To avoid the confounding influence of . . . we included a control group that . . .*
  - *These sites were chosen because . . .*

Goal: Agree that your methods are accurate, valid, reliable, and/or innovative in advancing your research area

- Based on the premise that the value and usefulness of a study's findings—and the authors' conclusions about them—depend on the quality of the study's design and methods
- Responds to what reviewers might raise questions (or complain) about
- Requires making well-rounded arguments:
  - Evidence and reasoning to convince readers that your methods are strong
  - Acknowledgement of limitations to your methods
  - Evidence and reasoning to convince readers that other methods are limited or flawed
- Especially requires arguing for effective controls against confounding variables
- Knockout goal for grant proposals!

Writing Results Sections

Communication Goals for Results Sections

- Accurately summarize and *remember* the results that you will use to answer your research question(s) or solve your research problem(s)
- Understand, agree with, and remember your *interpretations* of key results
  - Interpretations as answers to *sides* or *parts* of multi-sided or multi-part research questions

Goal: Accurately summarize and remember the results that you will use to answer your research question(s) or solve your research problem(s)

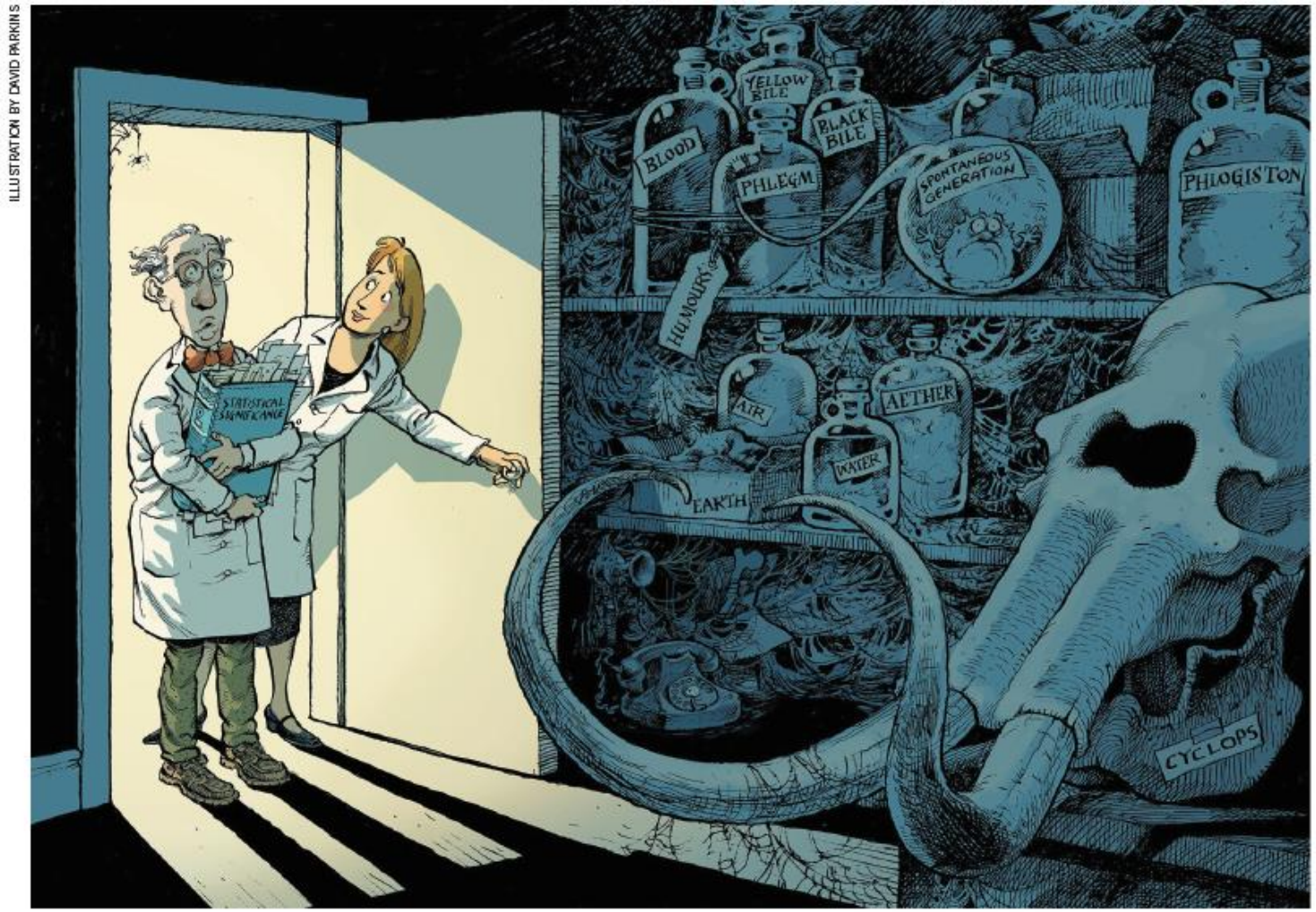
- Requires effective organization and *labeling* of results, often in subsections
- Engages skills and techniques of paragraph-level writing
  - Unity: 1 or 2 key results, or set of related results, per paragraph
  - Coherence by beginning sentences with old information
  - Parallel structure of successive phrases, clauses, and sentences
- Engages skills and techniques of effective sentence-level writing
  - Precision, clarity, and logic
  - Appropriate placement of words and phrases for emphasis
  - Strong, appropriate subjects and verbs
- Achieving the goal depends on *engaging* style
  - Focusing the reader's gaze on key data, especially in graphics
  - Showing readers *how* your results inform answers to your research question

Organizing Results Subsections and Paragraphs

- Organize by subsections that correspond to sides or parts of your research question
- Often effective to align the subsections with those in methods sections
- If necessary, start subsections by reorienting readers to your research question and/or methods, to provide appropriate context
- Use topic sentences to summarize or synthesize the results and, as appropriate, to present your interpretations
- Structure paragraphs as scientific arguments: claim, evidence and reasoning, responses to alternative claims

Goal: Understand, agree with, and remember your *interpretations* of key results

- Might include interpretations to convey:
  - Answers to sides or parts of your research question
  - The statistical reliability or reproducibility of your results
  - The meaning or significance (importance) of your results in scientific, social, clinical, or natural settings
- Best structured as a scientific argument
- Might need to acknowledge and address alternative interpretations (if not in the results section, then in the discussion section)



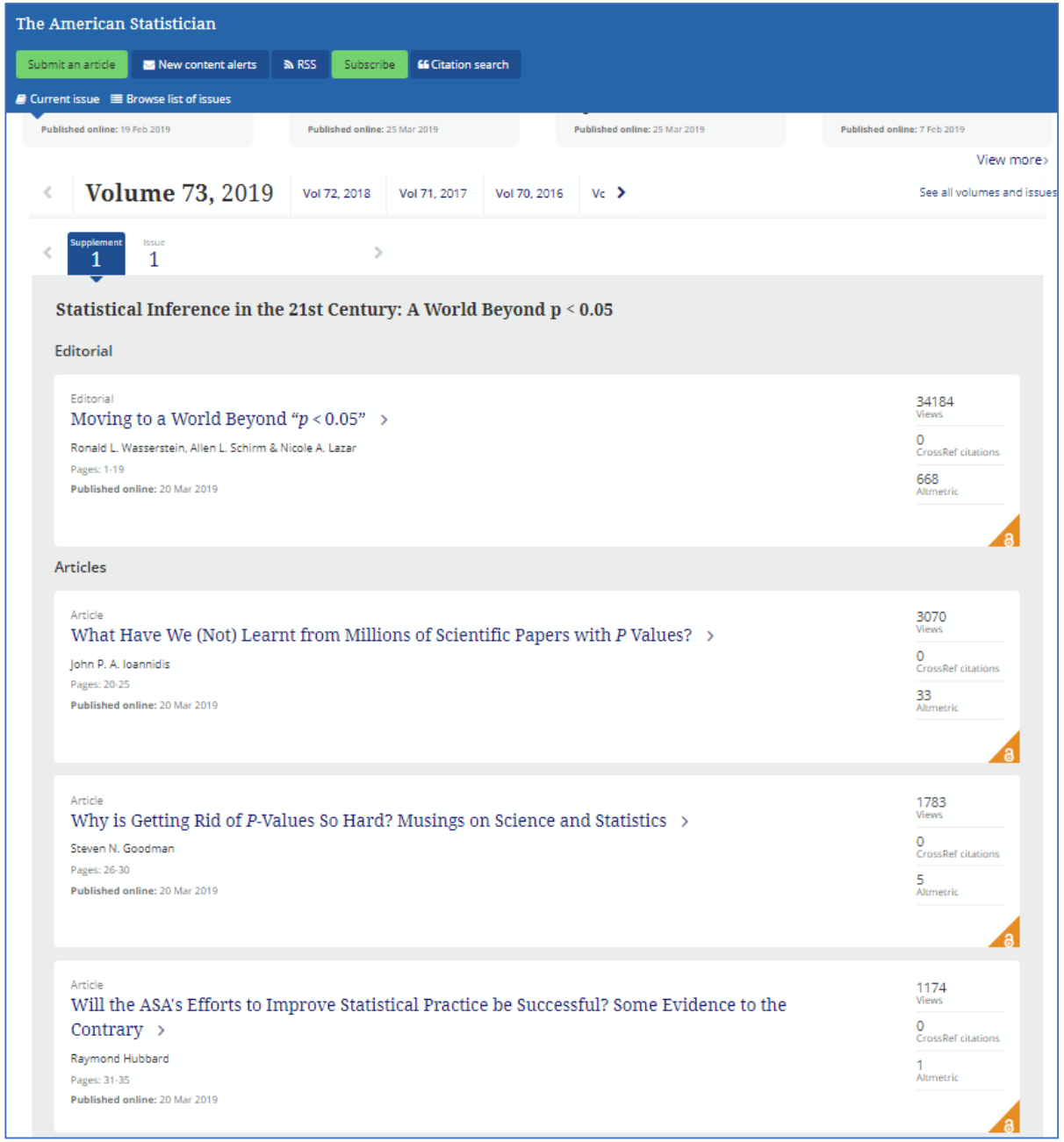
Retire statistical significance

Valentin Amrhein, Sander Greenland, Blake McShane and more than 800 signatories call for an end to hyped claims and the dismissal of possibly crucial effects.

Amrhein V, et al. *Nature*. 2019;567:305–7.

March 2019 issue of *The American Statistician*

- 43 papers on statistical interference
- Calls on authors and journal editors to rethink and *disavow* the phrase “statistically significant”
- Addresses challenges of resistance to change



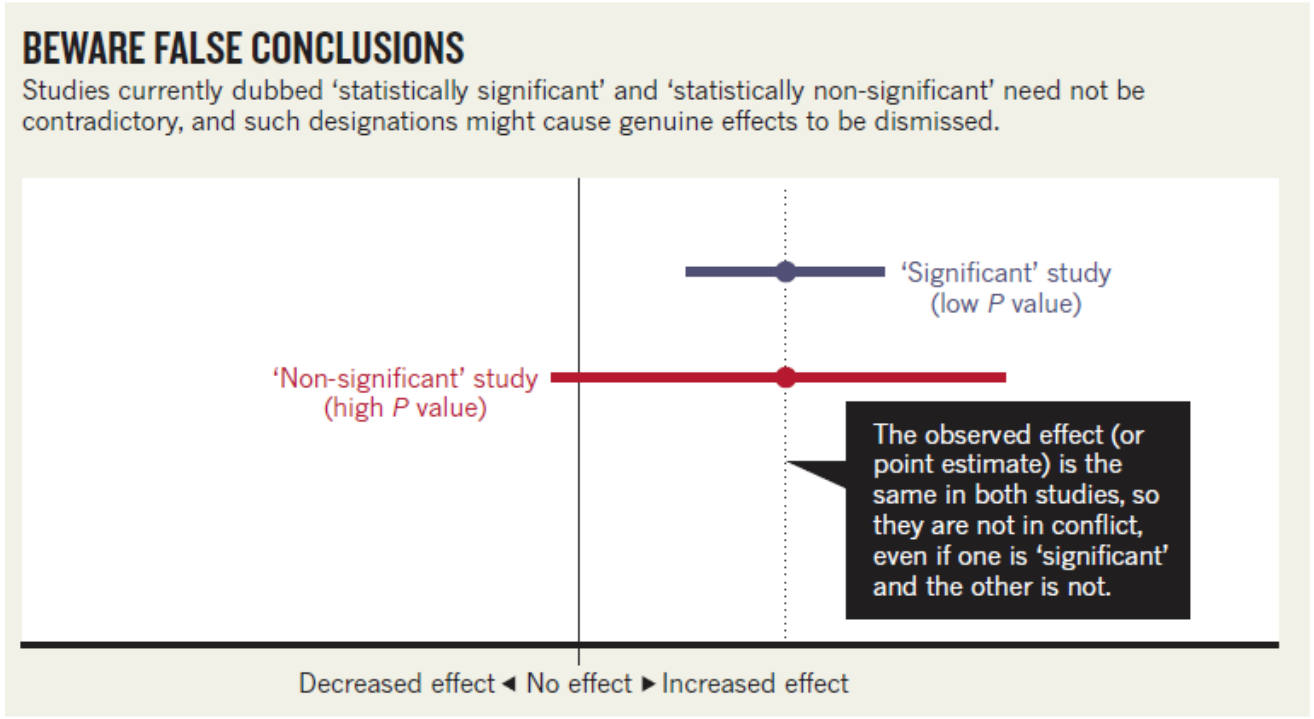
Wasserstein RL, et al. *Am Stat*. 2019;73:1–19.

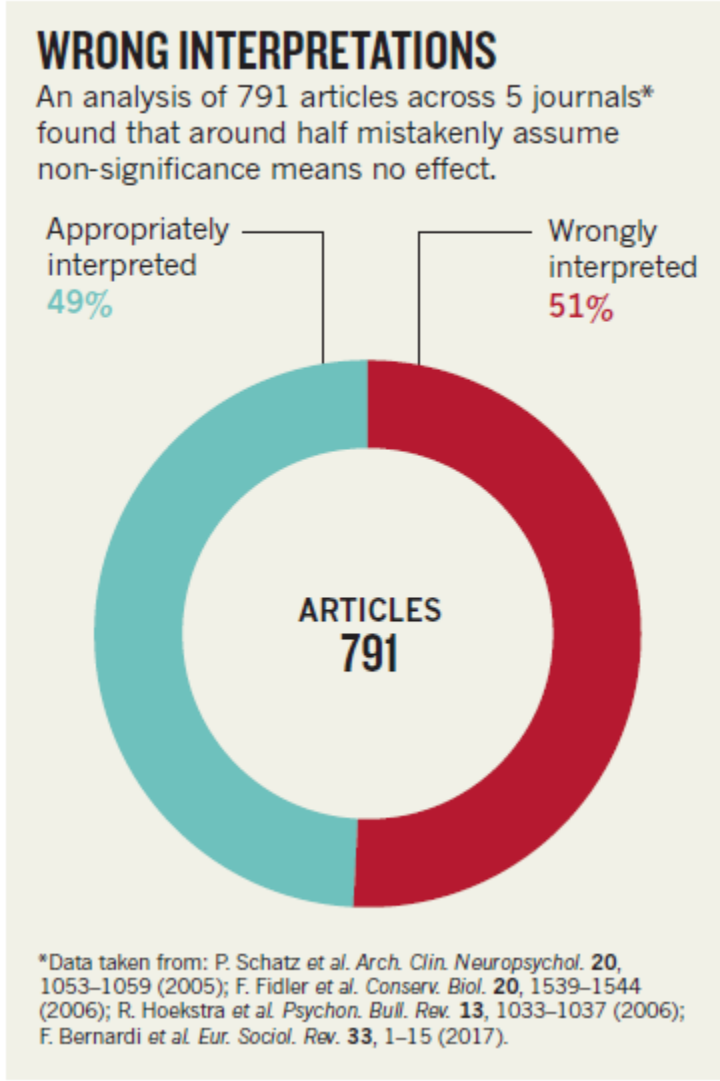
Quotes from the Nature Editorial

- How do statistics so often lead scientists to deny differences that those not educated in statistics can plainly see? For several generations, researchers have been warned that a statistically non-significant result does not 'prove' the null hypothesis . . . . Nor do statistically significant results 'prove' some other hypothesis. Such misconceptions have famously warped the literature with overstated claims and, less famously, led to claims of conflicts between studies where none exists.
- Let's be clear about what must stop: we should never conclude there is 'no difference' or 'no association' just because a P value is larger than a threshold such as 0.05 or, equivalently, because a confidence interval includes zero. Neither should we conclude that two studies conflict because one had a statistically significant result and the other did not. These errors waste research efforts and misinform policy decisions.
- The trouble is human and cognitive more than it is statistical: bucketing results into 'statistically significant' and 'statistically non-significant' makes people think that the items assigned in that way are categorically different.
- We must learn to embrace uncertainty. One practical way to do so is to rename confidence intervals as 'compatibility intervals' and interpret them in a way that avoids overconfidence. Specifically, we recommend that authors describe the practical implications of all values inside the interval, especially the observed effect (or point estimate) and the limits. In doing so, they should remember that all the values between the interval's limits are reasonably compatible with the data, given the statistical assumptions used to compute the interval.

Amrhein V, et al. *Nature*. 2019;567:305–7.

Wrong Interpretations of "Significance"





Amrhein V, et al. *Nature*. 2019;567:305–7.

Writing Discussion Sections for Research Papers and Body Sections for Review Papers and Book Chapters

Common Problems in Discussion and Body Sections

- Inert background information
- Content that simply restates the results section
- Omission of content to:
  - Answer research questions or solve research problems
  - Achieve the article's overall communication goals
- Omission of content needed to meet readers' pressing questions and expectations
- Missing or weak arguments, including insufficient evidence and reasoning
- Evidence (results) and reasoning without *context,* leading readers to ask, "Why are you telling me this?"
- Paragraph-level writing that doesn't ground readers to key communication goals
  - No grounding topic sentences
  - Lack of unity

What are *your* communication goals for discussion sections of IMRAD-formatted research papers or the body of review papers or book chapters?

1.

Example Communication Goals for Discussion Sections

- Recall the research question(s) or problem(s) that motivated your study, along with the relevant backstory
- Understand and agree with your conclusion—that is, the answer to your research question or the solution to your research problem
- Accurately (1) relate your conclusions (and supporting evidence and reasoning) to those from relevant previous studies and, as warranted, (2) know how to resolve inconsistencies, uncertainties, and debates
- Understand and agree with your explanations of the reasons or mechanisms that account for especially interesting or extraordinary results
- Agree that despite limitations to your study—which might include features of its design, methods, or results—your conclusions are still valid, valuable, and practical
- Understand and agree that what you have learned from your study has practical value and, as warranted, *implement* your study's key findings and lessons in practical settings
- Conduct new studies to advance the research, knowledge, and practical applications in your field

Goal: Recall the research question(s) or problem(s) that motivated your study, along with the relevant backstory

- Focuses or re-focuses the reader's attention
- Best to use early in the discussion—usually the 1st paragraph
- Might involve restating purposes, hypotheses, and/or innovative methods that address limitations of previous studies

Goal: Understand and agree with your conclusion

- Essential goal!
- Best to use early in the discussion—maybe the 1st or 2nd paragraph
- State your conclusion directly
- Make a well-rounded scientific argument to support your conclusion:
  - Supporting results, interpretations, and reasoning from your study
  - As warranted, supporting evidence and reasoning from other studies
  - Argument for what is novel and especially useful about your study
  - Your acknowledgment of and response to viable alternative conclusions, evidence, and reasoning
  - Your acknowledgment of and response to limitations to your argument

Goal: Accurately relate your conclusions to those from relevant previous studies and, as warranted, know how to resolve inconsistencies, uncertainties, and debates

- Essential for putting your research into the appropriate context
- Requires addressing the studies that readers will ask about—so you need to know the relevant literature
- *Synthesize* the outcomes of previous studies that support your conclusion and that do not support it
- As needed, argue for the greater validity, value, or practicality of your conclusion and results
    - May involve arguing for the strength of specific aspects of your methods

Goal: Understand and agree with your explanations of the reasons or mechanisms that account for especially interesting or extraordinary results

- Whether you use this goal depends on the results that readers will likely ask about
- Requires addressing the reasons and mechanisms that readers will likely know and ask about
- Requires detail in explaining all plausible reasons or mechanisms
- Often requires a well-rounded scientific argument
- Good to speculate on reasons and mechanisms, as long as your speculation is grounded to established evidence or theory

Goal: Agree that despite limitations to your study, your conclusions are still valid, valuable, and practical

- A goal for most (all?) discussion sections
- Requires addressing only the limitations that well-informed readers will ask about
- If the effects aren't obvious to readers, explain how the limitation might have influenced your study's outcomes
- Might help to explain why the limitation was unavoidable (or problematic to avoid) and what you did to minimize its effects
- As needed, argue that, despite your study's limitations, its outcomes are still valid, valuable, and practical
    - Might require presenting supporting evidence from the literature

Goal: Understand and agree that what you have learned from your study has practical value and, as warranted, *implement* your study's key findings and lessons in practical settings

- Especially important goal—but, unfortunately, rarely used
- Skill in using this goal can transform your writing and research in many positive ways
- Best to speak directly to the needs and interests of the journal's readership
- Engages creative problem solving, which everyone values
- Requires *demonstrating* potential applications in specific areas of science, nature, or society
- Might involve generating *tutorial-like* content

Drafting Titles

- Title your paper to convey the defining features of your research issue
- Restrict your titles to *approximately* 8 to 15 words
- Highlight the novel and unique features of your research issue and paper
- Include specific words and phrases that reflect your paper's overall goal
- Consider titles that raise your research question directly or that answer your research question

Common Problems in Review Papers and Book Chapters

- Redundant reviews on well-worn topics
- Old-fashioned reviews of literature with inert background information
- Poorly identified or missing research questions or problems
- Poorly identified or missing purposes
- Claims or positions that aren’t supported with convincing evidence and reasoning
- Purposes (other than argumentative purposes) that aren’t achieved
- Lack of integration and synthesis of related or supporting research
- Oversights of practical implementation of knowledge, evidence, and arguments

Example Communication Goals for Body Sections of Review Papers and Book Chapters

- Recall the questions, problems, and/or purposes that motivated your review or chapter
- Understand your premises, claims, or positions (related to the motivating questions, problems, and/or purposes)
- Understand and agree with the research evidence and reasoning that support your claims or positions
- Know to resolve inconsistencies, uncertainties, and debates in the literature and in practical settings
- Agree that despite limitations to your premises, positions, and arguments, they are still valid, valuable, and practical
- Implement key lessons and strategies derived from your review or chapter in practical settings
- Conduct new studies that advance the research issue/field on which your review or chapter is based

Identifying the Core Problem

In addressing a Conference on Physical Fitness in Youth in 1961, Kennedy said, “I want to urge that this be a matter of great priority. ‘A sound mind and a sound body’ is one of the oldest slogans of the Western World. I am hopeful that we will place a proper weight on intellectual achievement, but in my judgment, for the long-range happiness and well-being of all of you, for the strengthening of our country, for amore active and vigorous life, all of you as individuals and as groups will participate in strengthening the physical well-being of young American boys and girls.”

In retrospect, President Kennedy’s words have an ironic ring, given that American children of the 1960s were almost certainly more physically active and fit than are today’s children (2,3). Because public health surveillance systems did not include measures of PA in the 1960s, we cannot be certain of the extent to which PA levels in youth have declined over the past 60 yr. But what is certain is that, today, millions of American children are less physically active and fit than experts recommend (4,5). It is also certain that a substantial public health burden is associated with low PA in youth and that this burden includes rates of overweight and obesity that have skyrocketed over the past 30 yr (6,7).

Stating the Purpose and Strategy

This article is based on the premise that, for the United States and most economically developed nations, promotion of PA in children and youth constitutes one of the great public health challenges of the 21st century. Our primary purpose in this article is to lay out a comprehensive plan that we believe has the potential to meet that challenge. The plan is composed of specific strategies for which both evidence supporting intervention effectiveness and experience with implementation in large-scale applications exist. The selected strategies are applied across multiple societal sectors. Furthermore, we make the case that the plan's ultimate success will depend upon effective application of public health methods that have succeeded in advancing the public's health in other areas, such as tobacco control. We begin with a concise summary of the body of knowledge that constitutes the rationale for launching a large-scale public health effort to promote PA in U.S. children and youth.

BACKGROUND

PA and Health in Children and Youth

An extensive body of knowledge documents the health benefits of PA during childhood and adolescence, and the report of the 2018 Physical Activity Guidelines Advisory Committee provides an important compilation of the relevant scientific literature (8). Based on its review of studies using observational and experimental research designs, the U.S. federal advisory group concluded that maintaining higher levels of PA and increasing PA are associated with the following health benefits:

- Improved cardiorespiratory endurance and muscular fitness
- More favorable body weight and adiposity
- Improved indicators of bone health
- Improved cardiovascular and metabolic biomarkers
- Positive effects on brain health, cognition, and academic outcomes

This foundation of scientific evidence has informed the development of public health guidelines on PA for children and youth. Multiple authoritative organizations around the world have developed such guidelines, and the consensus is that school-age children and adolescents should engage in moderate-to-vigorous intensity physical activity (MVPA) for at least 1 $h \cdot d^{-1}$. Within that hour of MVPA, guidelines recommend that youth regularly engage in resistance exercise, bone-loading activities, and vigorous intensity PA (9). For children under 6 years of age, the prevailing consensus is that they should be physically active for 3 $h \cdot d^{-1}$, with the activity including intensities ranging from light to vigorous (10). Unfortunately, population surveys have shown that most children and youth in the United States do not meet these targets (4). Accordingly, there is a need to design and implement a public health initiative that will produce population-level increases in PA in children and youth.

Notice how the background section ends by reiterating the problem and solution

Conceptual Basis for Promotion of PA in Children and Youth

Research studies aimed at understanding the factors that influence PA in young people have applied numerous theories

successful, any PA promotion initiative must change the behavior of individual children. Accordingly, researchers have given much attention to investigating the factors that associate with or influence change in PA in studies in which the unit of randomization and analysis is the individual child. Several theories of health behavior have been particularly prominent in establishing this body of evidence, and they are summarized in the Table. Social cognitive theory (11) is perhaps the theory most widely applied in studies of PA in children and youth. This theory posits that a child's PA behavior is influenced by the interactive effects of personal characteristics, environmental factors, and attributes of specific forms of PA (12).

In designing studies of interventions to increase PA in children, researchers frequently have applied certain conceptual frameworks. In addition, these frameworks often have been used to plan and evaluate public health interventions intended to promote children's PA. Several of these conceptual frameworks are summarized in the Table. In particular, one of these models, the Social Ecological Model (13), has been used widely in conceptualizing public health research and practice on promoting PA in youth. Accordingly, we apply this model in organizing the recommendations presented in this article.

STRATEGIES FOR PROMOTING PA IN CHILDREN AND YOUTH

The organizing scheme for the body is "strategies for promoting PA"

PA is a complex behavior. People engage in PA for many different reasons, in numerous settings, and in myriad forms. In children and youth, PA behavior may be even more complex than it is in older persons. It is well established that children's PA is associated with a very wide range of personal, social environmental, and physical environmental factors (14,15). Accordingly, interventions to increase PA in youth have been implemented in many settings and have applied a wide range of approaches.

The numerous approaches to increasing PA in young people vary greatly in quality and quantity of supportive evidence. In the following sections, we will present the approaches to promoting PA that we believe warrant including in a comprehen-

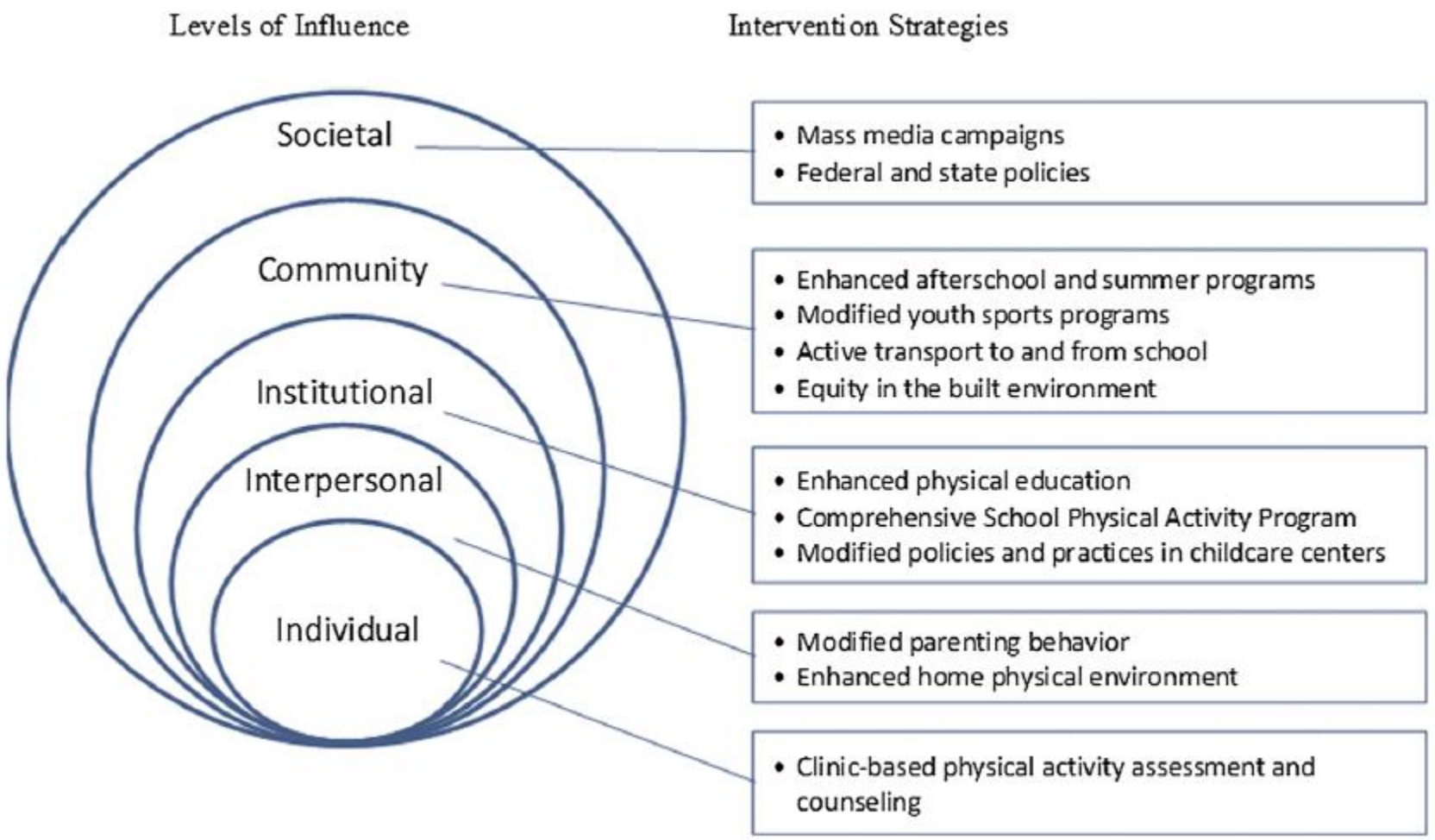


Figure. Application of the Social Ecological Model to identification of strategies for promotion of PA in youth.

Pate RR, Dowda M. *Ex Sport Sci Rev*. 2019; 47:3-14.

Use of Study Evidence to Support A Proposed Strategy

Schools can increase the amount of time youth spend engaging in MVPA during physical education classes. One study found that girls enrolled in physical education reported more MVPA and vigorous intensity PA. Specifically, girls enrolled in physical education reported 12%–32% more 30-min blocks of MVPA and 33%–60% more 30-min blocks of vigorous intensity PA, compared with those not enrolled in physical education (45). In addition, studies have shown that modifications to physical education classes can result in increased time spent in high-intensity PA. . . .

Pate RR, Dowda M. *Ex Sport Sci Rev*. 2019; 47:3-14.

Collegial Peer Review (and Mentoring) Process

- Revision by division: global structure, then content, then paragraphs, then sentences
- Use communication goals to guide review of content
- Review paragraphs for unity, topic sentences, and coherence
- Review sentences for logic, clarity and precision, style, grammar, and punctuation
- Show the writer what makes the draft strong, and help the writer reinforce strengths
- Show the writer what makes the draft problematic, and help the writer solve problems
- Make it *constructive* criticism
- Encourage dialogue and collaboration
- Avoid personal preferences

Revision by Division Approach

1. Discuss your comments on content, applying the goal-directed approach
2. Discuss a paragraph or two that might benefit from revision: unity, topic sentences, coherence
3. Discuss your edits and suggestions for revising at the sentence-level