

METASCIENCE
2021 CONFERENCE

Use less language; use more
figures, tables, color,
highlighting, and multimedia

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CENTER FOR
OPEN SCIENCE

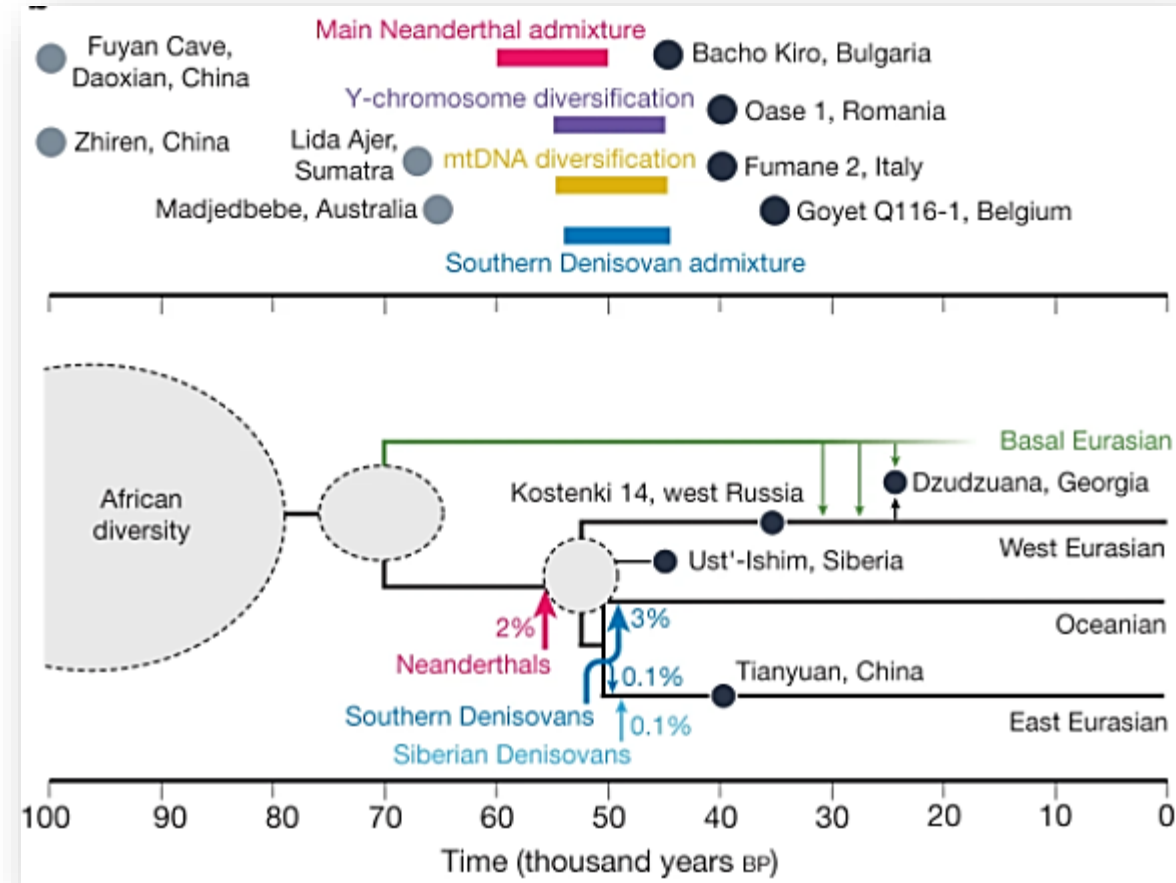
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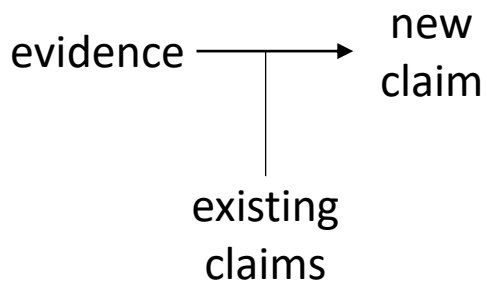
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Use less language; use more figures, tables, color, highlighting, and multimedia

- My field: language education – as researcher & practitioner
- This talk's heavy on opinion, theory, and “activism”; light on statistically analyzable empirical evidence....
- The central recommendation may feel like it's something that's already done, especially in STEM. But:
 - it's perhaps useful to **explicitly consider and articulate this practice**, acknowledging how it links with (& could further link with) the spirit of open science
 - in some parts of the academy (e.g. social sciences like educational research, or the 10,000s of academic English tutors worldwide), **this isn't done in many contexts**

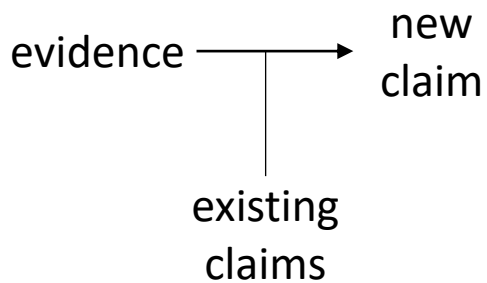


Metascience reforms have mainly focused on improving creation & sharing of the scientific **message** – but the **medium** is also important



science which isn't
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*e.g. questionable
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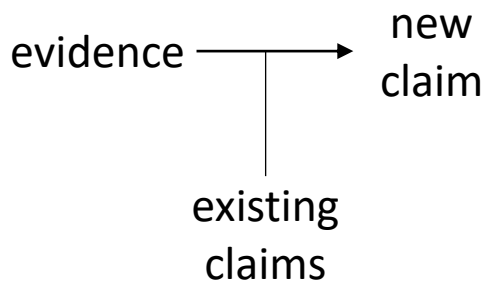


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improved **creation** of scientific information
e.g. pre-registration, improved statistical inference, more replications, ...

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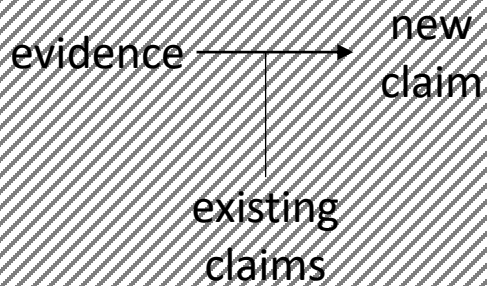
improved **creation** of scientific information
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improved **access** to scientific information
e.g. open data, open materials, open code, open peer review, preprints, ...

Metascience reforms have mainly focused on improving creation & sharing of the scientific **message** – but the **medium** is also important

But the nature of the **medium** through which science is communicated (primarily paragraphed declarative sentences in the English language) still acts as a barrier



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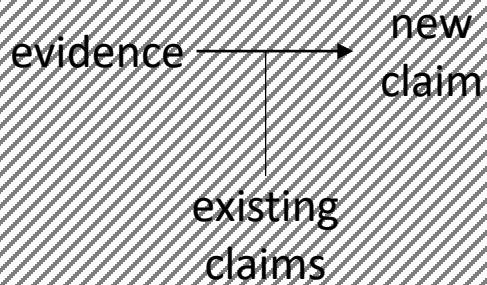


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improved **communication** of scientific information
e.g. English language standards, more use of multimedia, ...

Why is natural language a barrier for science?

- Difficult to create
 - Learning to read and write English in an appropriate academic style takes many years (many tools for the scientific process have been made **open source**, e.g. R; but English is very much **not** open source)
 - Even if your English proficiency is at a high level, it still takes a long time to write in the appropriate style
- Difficult to consume
 - Learning to read English of this style takes many years
 - Even if your English proficiency is at a high level, consuming paragraphed language is slow
- Ambiguity high
 - Natural language is inherently ambiguous, especially in the social sciences when the phenomena are less immediately tangible

(录用定稿) 网络首发时间: 2021-09-24 09:43:40

新冠肺炎疫情是否激发了康养旅游意愿? —— ——一个条件过程模型的检验

程云殷杰

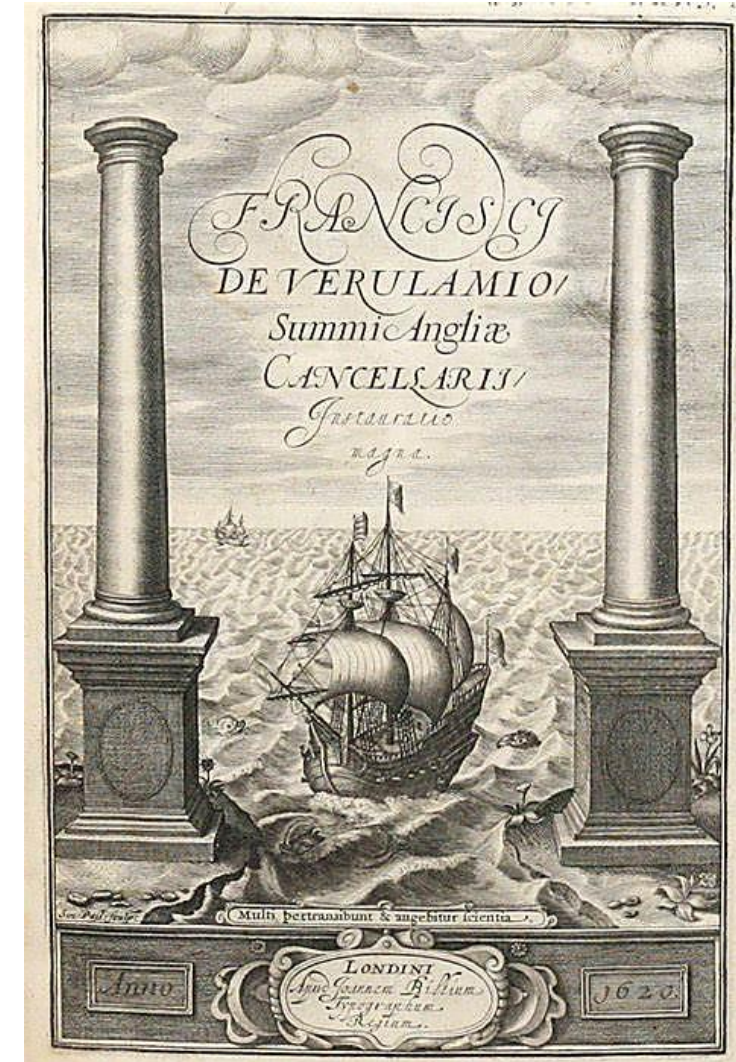
华侨大学旅游学院

摘要: 新冠肺炎疫情的暴发与蔓延对大众身心健康造成了影响, 康养旅游则是缓解大众身心健康的重要方式。探讨疫情影响下大众康养旅游意愿, 对旅游业提振恢复具有重要意义。文章基于刺激-机体-反应 (SOR) 理论, 通过网络问卷对 313 名大众进行调查, 并以风险感知为中介变量, 以风险传播为调节变量, 重点探讨大众新冠肺炎疫情的事件强度认知 (新颖性认知、颠覆性认知和关键性认知) 对其康养旅游意愿的影响机理。结果显示: (1) 大众对新冠肺炎疫情的新颖性认知会抑制其康养旅游意愿, 颠覆性认知并不影响大众康养旅游意愿, 而事件的关键性认知能够唤起大众康养旅游意愿; (2) 新冠肺炎疫情事件的新颖性认知对大众风险感知产生负向影响, 而事件的关键性认知和颠覆性认知能够正向提升大众风险感知水平; (3) 风险感知在事件的新颖性认知、关键性认知对康养旅游意愿的影响过程中起部分

For those who didn't learn Chinese as a child, try reading a few sentences of this article: it gives a sense of how difficult it is to read/write scientific publications in English for most people on the planet

Why is natural language a barrier for science?

- “**knowledge itself is more beautiful than any apparel of words that can be put upon it**” (Bacon, 1592)
- “words are formed at the will of the generality, and there arises from a bad and unapt formation of words a wonderful obstruction to the mind. Nor can the definitions and explanations with which learned men are wont to guard and protect themselves in some instances afford a complete remedy—words still **manifestly force the understanding, throw everything into confusion**, and lead mankind into **vain and innumerable controversies and fallacies.**” (Bacon, 1620)
- “It will be **convenient for the signs to be as natural as possible** ... this universal writing will be as **easy as it is common**, and will be capable of being read without any dictionary” (Leibniz, 1666)
- “the search for a neutral system of formulae, for **a symbolism freed from the slag of historical languages**” (Vienna Circle Manifesto, 1929)
- The information technology revolution from the late 20th century onwards gives us more chance to achieve these goals than Bacon, Leibniz, Neurath and their contemporaries had



Reforms to scientific communication

- Discourse **reporting guidelines** (e.g. APA JARS, EQUATOR, PRISMA)
- **Controlled vocabulary** (e.g. ERIC thesaurus)
- More **technologically augmented** scientific communication (e.g. Sci-Note)
- **Majority intelligibility standards** for evaluating communication (not prestige standards) (e.g. requirement among major journal publishers that peer reviewers do not take into account dialect of writing)
- **More multimedia** (less language)
 - This is already a trend in STEM; I advocate explicit promotion, & promulgation across the social sciences)
- (These different reforms discussed in my BALEAP presentation osf.io/myx95 Jeffrey 2021 “EAP in a scientific revolution - BALEAP 2021 conference presentation”)



Less language; more multimedia

- More efficient to create (in many cases, for many people)
- More efficient to consume
 - Mayer's research into multimedia learning (2009 *Multimedia Learning*)
- Less ambiguity

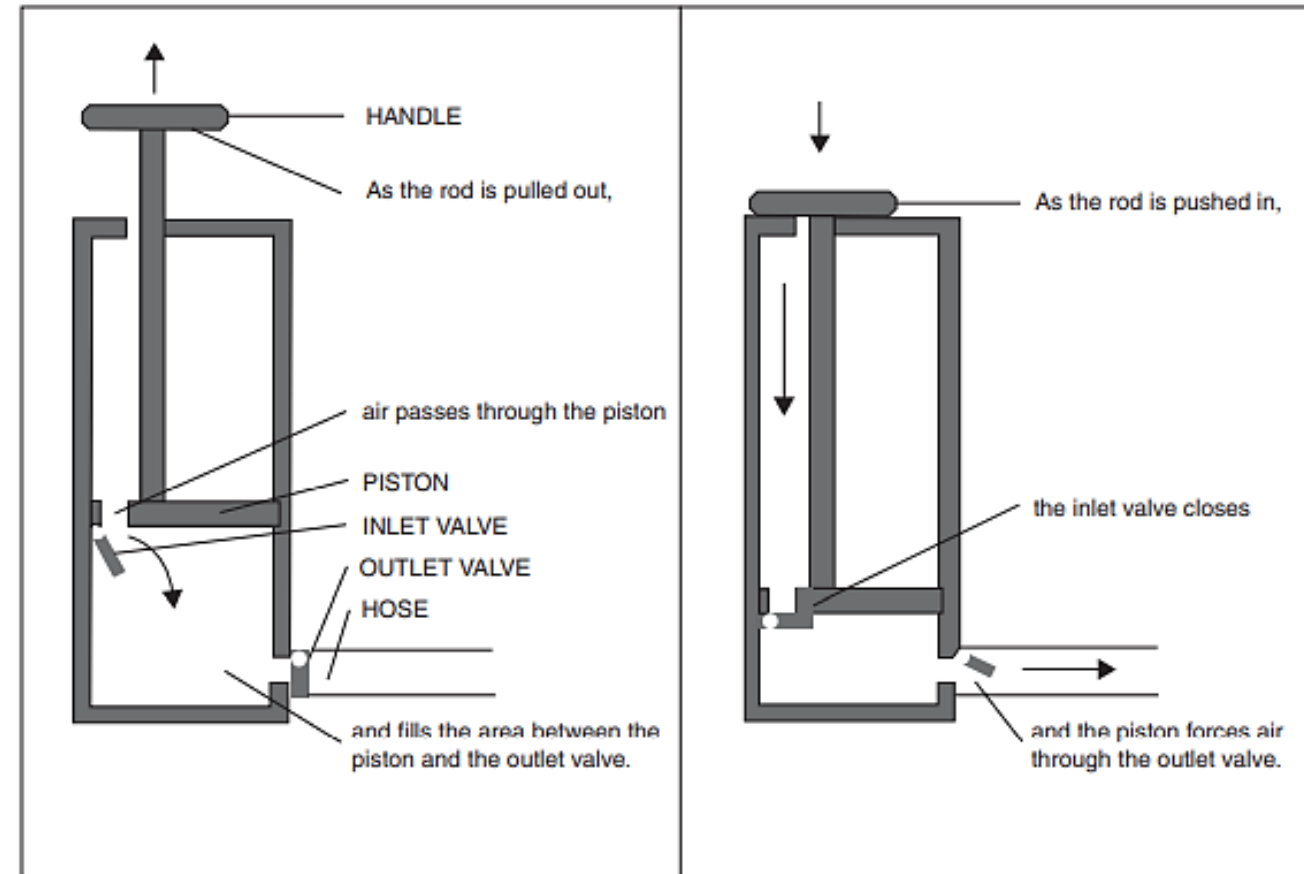


Figure 12.2. Illustration of how a pump works, with corresponding words.

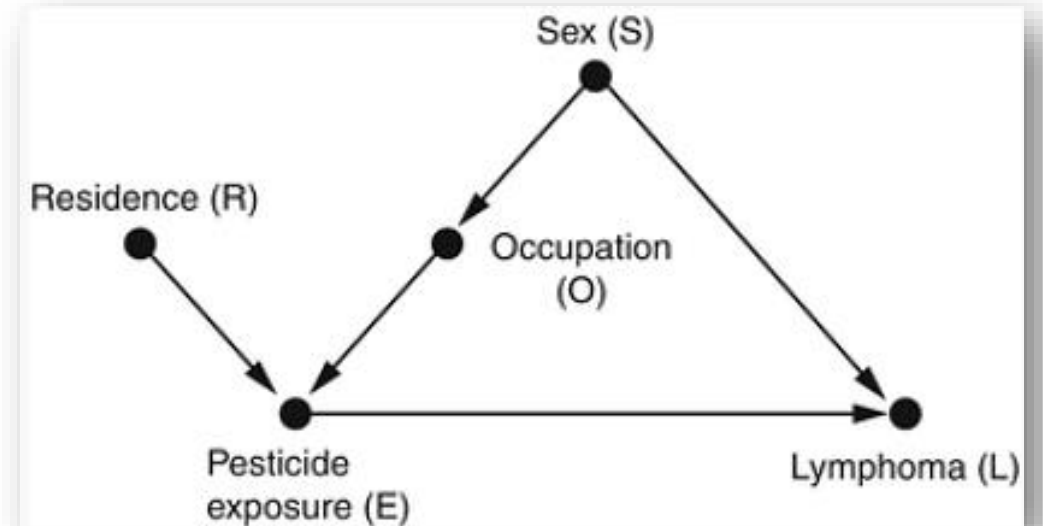
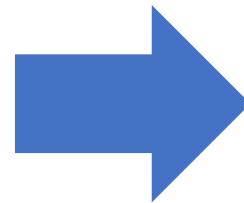
Less language; more tables & figures

Pesticide exposure increases the risk of lymphoma.

Sex affects exposure probability through occupation, while sex is directly related to lymphoma risk as the outcome. Residence also affects pesticide exposure probability.

Less language; more tables & figures

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The master narrative voices identified were twofold. First, much discourse centered around the dimension of struggle and success, this itself manifested in two sub-dimensions. Self-actualization as a member of a larger gay community was seen as the end goal of healthy sexual identity development, or “coming out”.

My path of gayness ... going from denial to saying, well this is it, and then the process of coming out, and the process of just sort of, looking around and seeing, well were do I stand in the world, and sort of having, uh, political feelings. (Carl, age 50)

Further, maintaining healthy sexual identity entails vigilance against internalization of society discrimination.

When I’m like thinking of criticisms of more mainstream gay culture, I try to ... make sure it’s coming from an appropriate place and not like a place of self-loathing. (Patrick, age 20)

The second major theme was emancipation. Emancipation was expressed in either open exploration of an individually fluid sexual self as the goal of healthy sexual identity development, or in questioning discrete, monolithic categories of

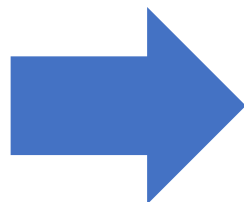
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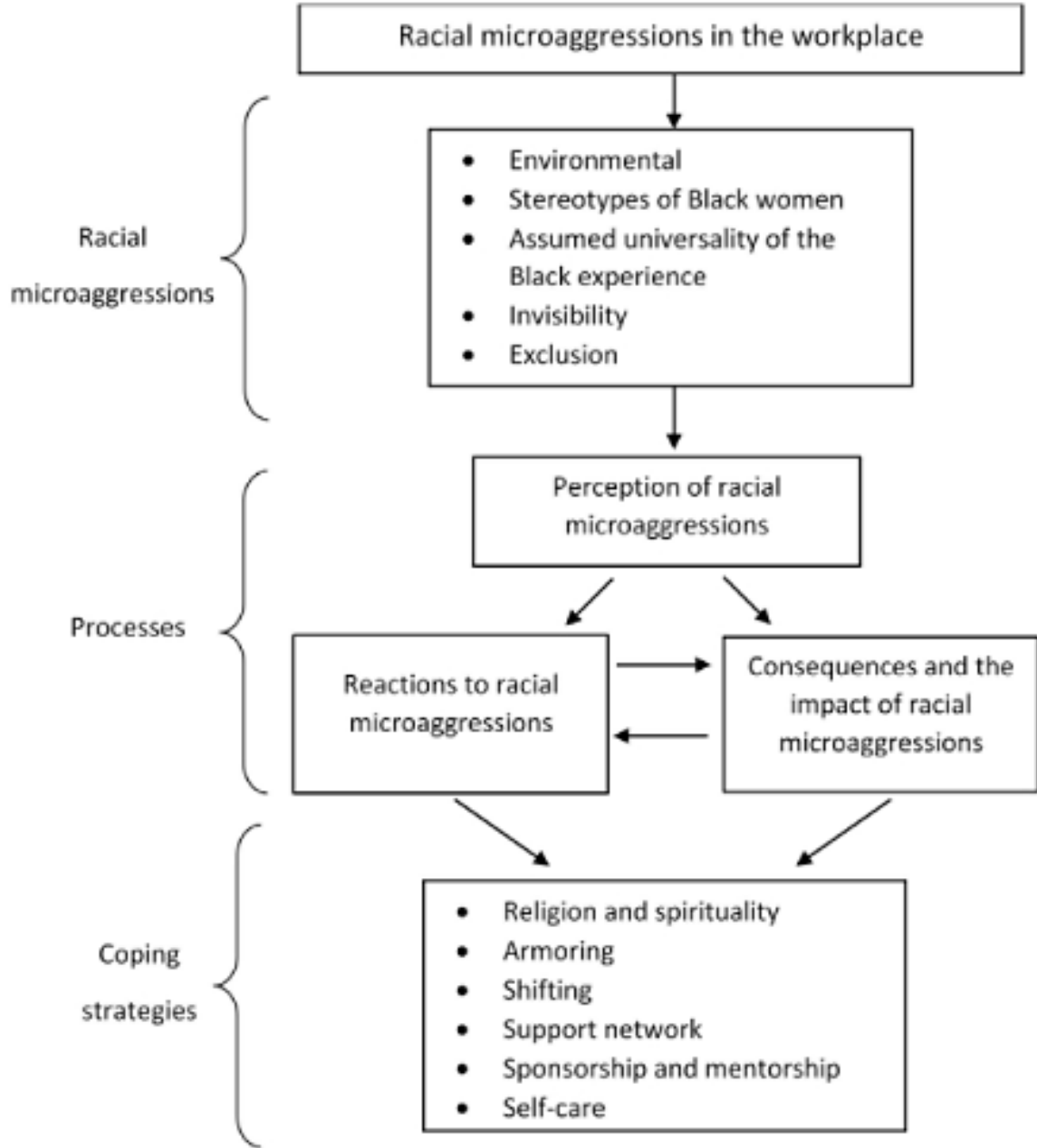
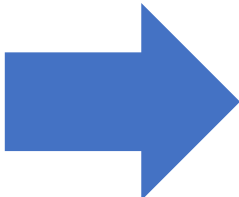
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Discourse and dimension	Example quote
Struggle and success ^a	
Self-actualization as member of a larger gay community is the end goal of healthy sexual identity development, or “coming out”	“My path of gayness ... going from denial to saying, well this is it, and then the process of coming out, and the process of just sort of, looking around and seeing, well where do I stand in the world, and sort of having, uh, political feelings.” (Carl, age 50)
Maintaining healthy sexual identity entails vigilance against internalization of societal discrimination	“When I’m like thinking of criticisms of more mainstream gay culture, I try to ... make sure it’s coming from an appropriate place and not like a place of self-loathing.” (Patrick, age 20)
Emancipation ^b	
Open exploration of an individually fluid sexual self is the goal of healthy sexual identity development	“[For heterosexuals] the man penetrates the female, whereas with gay people, I feel like there is this potential for really playing around with that model a lot, you know, and just experimenting and exploring.” (Orion, age 31)
Questioning discrete, monolithic categories of sexual identity	“LGBTQI, you know, and added on so many letters. Um, and it does start to raise the question about what the terms mean and whether ... any term can adequately be descriptive.” (Bill, age 50)

Organizational Framework for Racial Microaggressions in the Workplace

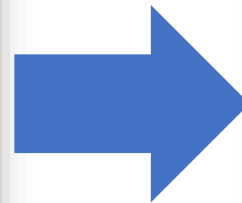


Less language; more color

Baseline characteristic	n	%
Marital status		
Single	41	27.3
Married/partnered	101	67.3
Divorced/widowed	6	4
Other	2	1.3
Highest educational level		
Middle school	2	1.3
High school/some college	52	34.7
University or postgraduate degree	89	59.3
Employment		
Unemployed	10	6.7
Student	18	12
Employed	99	66
Self-employed	21	14
Retired	2	1.3

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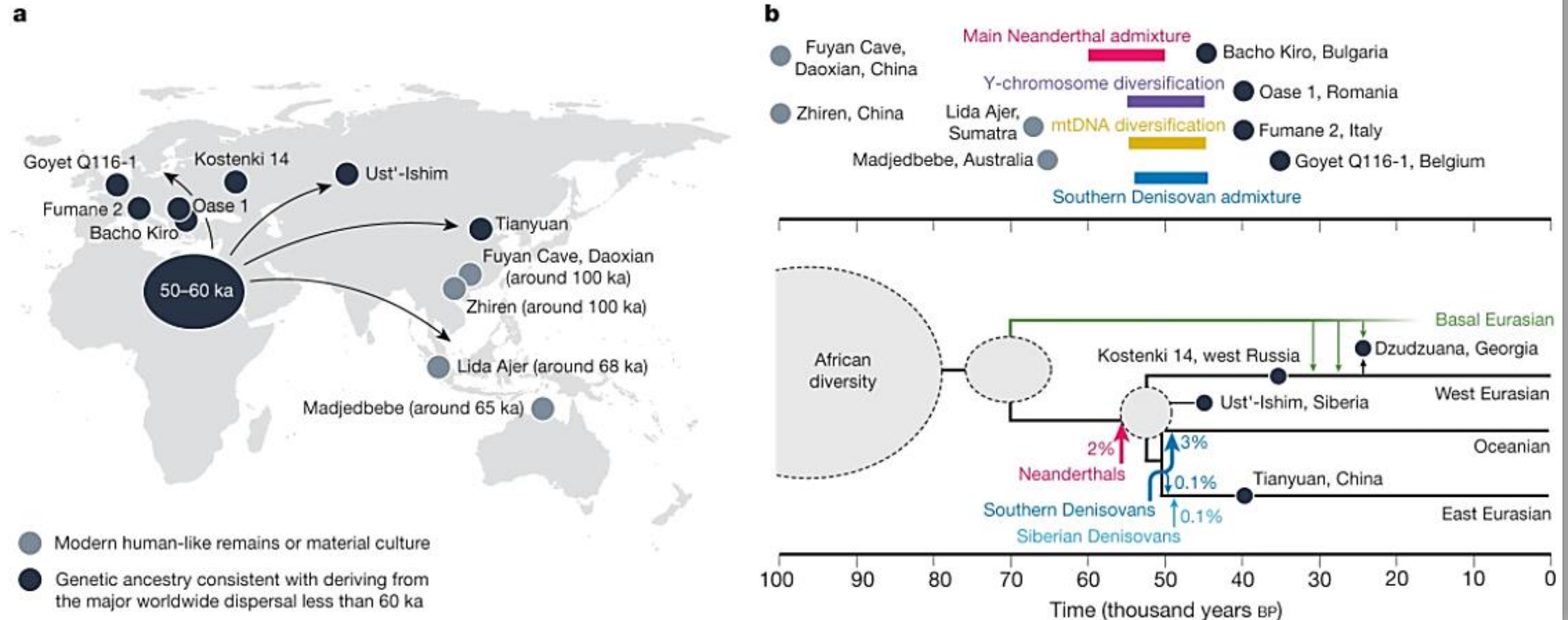


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Visualization that better matches the nature of the information

Fig. 1: Worldwide expansion and archaic admixture (phase 3).

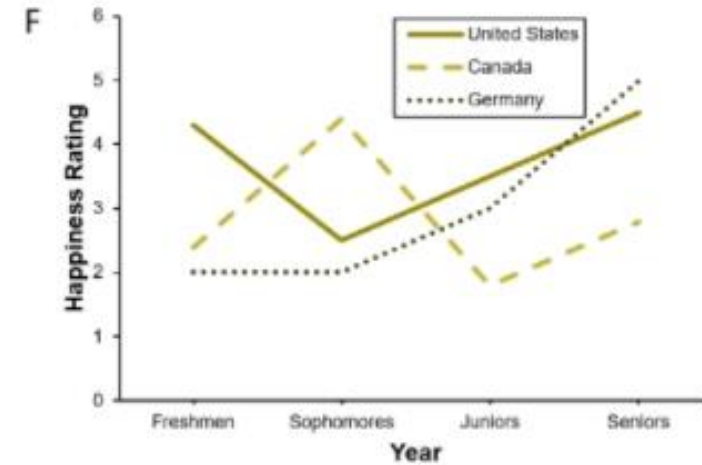
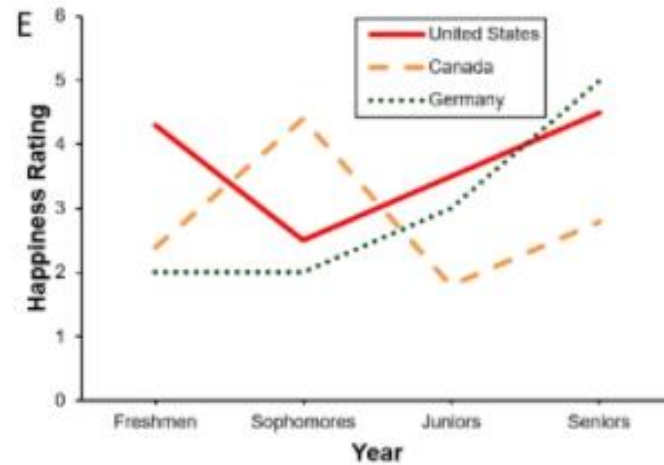
From: Origins of modern human ancestry



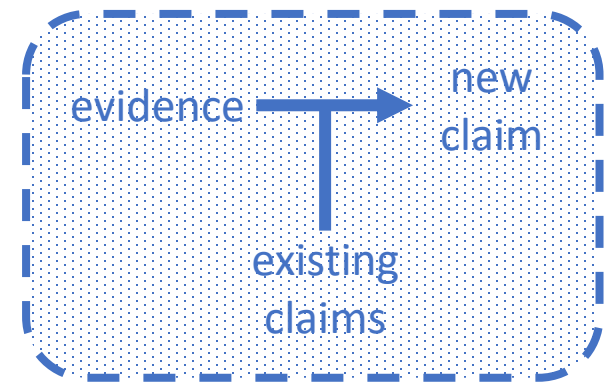
Relevant to who?

- Researchers
- Creators of style/reporting guides (e.g. APA Style, journal editors, ...)
- Those of us training researchers of the future (e.g. experienced researchers, English teachers, ...)
- **But:** remember accessibility needs

Student Happiness Ratings as a Function of Year and Country of Origin



Summary



- The more dependent we are on natural language (such as English),
 - the **higher the barriers to scientific knowledge creation & consumption;**
 - the **higher the ambiguity**
- We may benefit from being increasingly proactive about the use of **multimedia** in scientific communication
- This is one example how efforts toward improving the **medium** of science can also make science more open (in addition to the efforts toward improving the message of science)

Thank you for listening 😊 Eager to continue discussion:

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