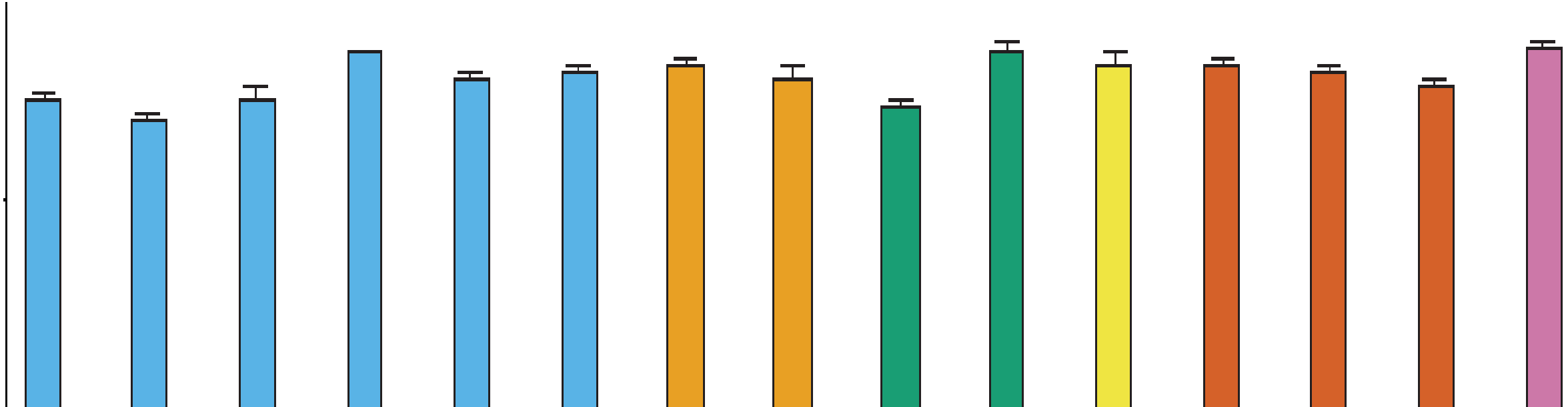
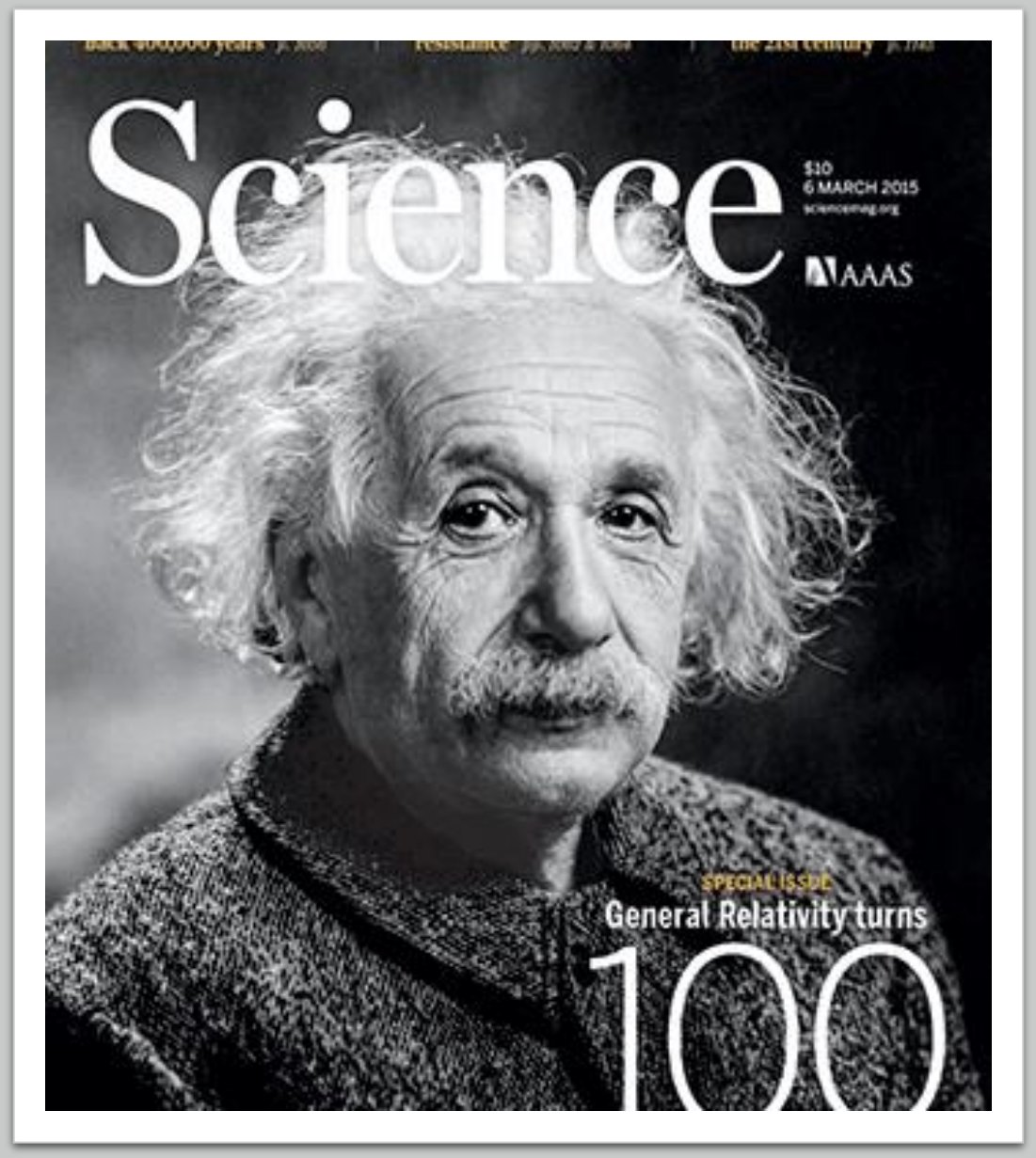
# Het F-woord

## Hoort wetenschapsfraude in de biologieles thuis?

**Martin Enserink**
International news editor, *Science* magazine
13 November 2021






# *Science*

- Amerikaans weekblad met mondiaal publiek

- Belangrijkste doelgroep: wetenschappers

2003

# The Genome Sequence of the SARS-Associated Coronavirus

Marco A. Marra,[1*] Steven J. M. Jones,[1] Caroline R. Astell,[1] Robert A. Holt,[1] Angela Brooks-Wilson,[1] Yaron S. N. Butterfield,[1] Jaswinder Khattra,[1] Jennifer K. Asano,[1] Sarah A. Barber,[1] Susanna Y. Chan,[1] Alison Cloutier,[1] Shaun M. Coughlin,[1] Doug Freeman,[1] Noreen Girn,[1] Obi L. Griffith,[1] Stephen R. Leach,[1] Michael Mayo,[1] Helen McDonald,[1] Stephen B. Montgomery,[1] Pawan K. Pandoh,[1] Anca S. Petrescu,[1] A. Gordon Robertson,[1] Jacqueline E. Schein,[1] Asim Siddiqui,[1] Duane E. Smailus,[1] Jeff M. Stott,[1] George S. Yang,[1] Francis Plummer,[2] Anton Andonov,[2] Harvey Artsob,[2] Nathalie Bastien,[2] Kathy Bernard,[2] Timothy F. Booth,[2] Donnie Bowness,[2] Martin Czub,[2] Michael Drebot,[2] Lisa Fernando,[2] Ramon Flick,[2] Michael Garbutt,[2] Michael Gray,[2] Allen Grolla,[2] Steven Jones,[2] Heinz Feldmann,[2] Adrienne Meyers,[2] Amin Kabani,[2] Yan Li,[2] Susan Normand,[2] Ute Stroher,[2] Graham A. Tipples,[2] Shaun Tyler,[2] Robert Vogrig,[2] Diane Ward,[2] Brynn Watson,[2] Robert C. Brunham,[3] Mel Krajden,[3] Martin Petric,[3] Danuta M. Skowronski,[3] Chris Upton,[4] Rachel L. Roper[4]

We sequenced the 29,751-base genome of the severe acute respiratory syndrome (SARS)–associated coronavirus known as the Tor2 isolate. The genome sequence reveals that this coronavirus is only moderately related to other known coronaviruses, including two human coronaviruses, HCoV-OC43 and HCoV-229E. Phylogenetic analysis of the predicted viral proteins indicates that the virus does not closely resemble any of the three previously known groups of coronaviruses. The genome sequence will aid in the diagnosis of SARS virus infection in humans and potential animal hosts (using polymerase chain reaction and immunological tests), in the development of antivirals (including neutralizing antibodies), and in the identification of putative epitopes for vaccine development.

An outbreak of atypical pneumonia, referred to as severe acute respiratory syndrome (SARS) and first identified in Guangdong Province, China, has spread to several countries. The severity of this disease is such that the mortality rate appears to be ~3 to 6% be as high as 43 to 55% in people older than 60 years (*1*). A number of laboratories worldwide have undertaken the identification of the causative agent (*2, 3*). The National Microbiology Laboratory in Canada obtained the Tor2 isolate from a patient in Toronto and succeeded in

***Science***

Twee soorten artikelen:

1) Wetenschap

2003

SARS in China News Focus Spec

# China's Missed Chance

Aggressive public health measures helped scientists lost a unique opportunity to shi

BEIJING—In mid-March, severe acute respiratory syndrome (SARS) began spiraling out of control. A doctor staying in room 911 of the Metropole Hotel in Hong Kong had infected 12 other people, who in turn had sown new

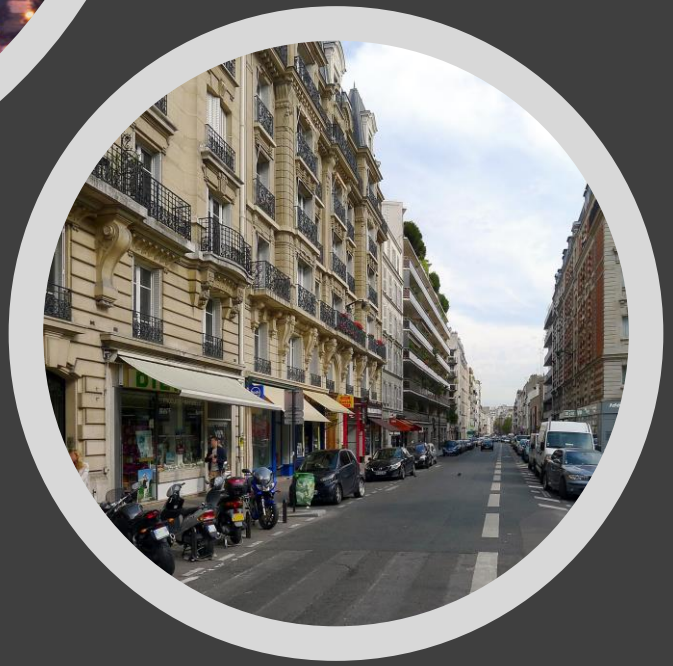
Yang Ruifu, a soft-spoken microbiologist and a member of the team at the Academy of Military Medical Sciences (AMMS) that discovered the coronavirus. Promoted by Hong Tao, an esteemed senior microbiologist and member of the Chinese Academy of Engineering, the *Chlamydia* hypothesis had become so well established that "it would not have been respectful" to challenge it, Yang says. Indeed, others say, the Ministry of Health had effectively banned alternative views.

And so the team did not seek media attention for its discovery; nor did it alert any of the labs in the WHO network. If the re-

## *Science*

Twee soorten artikelen:

1) Wetenschap
2) Journalistieke verhalen



- Washington, DC (1999-2004)
- Parijs (2004-2012)
- Amsterdam (2012-nu)

1998

CLINICAL TRIALS

# Fraud and Ethics Charges Hit Stroke Drug Trial

AMSTERDAM, THE NETHERLANDS—It should have been a landmark study in stroke research, capable of changing the way the disease is treated. But the Second European Stroke Prevention Study (ESPS 2), a major clinical trial of a drug to prevent repeat strokes—involving almost 7000 patients in 13 European countries—has become mired in controversy. A paper describing promising results from the trial, published earlier this month in the *Journal of the Neurological Sciences*, was first turned down by *The Lancet* in part because of ethical concerns over the use of placebos. And it has been further tainted by

ing the 2 years the patients were followed; aspirin, which was also tested, gave a risk reduction of 18%; but combined the two lessened the chances of a stroke by 37%, with relatively few side effects. The death rates in all three treatment groups were about the same, however, and did not differ significantly from that of the placebo group.

But the encouraging news in the ESPS 2 results was soured by the paper's guarded suggestions of data problems discovered during the study. The paper refers to "serious inconsistencies in patient case record forms and compliance assay determinations" at one

Boehringer Ingelheim. "We subsequently had some conversations and carried out an investigation, but we were unable to establish either guilt or innocence. So we left it at that," says Sissingh.

Chris Verhorst, medical director of Boehringer Ingelheim Netherlands, says the trial's organizers first became concerned about the large number of patients enrolled by a single physician and the unusual dedication with which they took their daily medication. Suspicions grew, says Lowenthal, when blood pressure data submitted by the physician turned out to be distributed along a perfect Gaussian curve—which is highly unlikely in a patient sample of this size.

According to the trial protocol, patient compliance was tested by assaying drug levels in plasma from 15% of the patients. Lowenthal says analysis of the suspect samples showed that all of them came from just two individuals, and all contained both drugs, which would have

2017

FEATURES

# FISHY BUSINESS

## Accusations of research fraud roil a tight-knit community of ecologists

*By* **Martin Enserink**, *in Gotland, Sweden*

2016

*Science*

ECOTOXICOLOGY

# Environmentally relevant concentrations of microplastic particles influence larval fish ecology

Oona M. Lönnstedt* and Peter Eklöv

The widespread occurrence and accumulation of plastic waste in the environment have become a growing global concern over the past decade. Although some marine organisms have been shown to ingest plastic, few studies have investigated the ecological effects of plastic waste on animals. Here we show that exposure to environmentally relevant concentrations of microplastic polystyrene particles (90 micrometers) inhibits hatching, decreases growth rates, and alters feeding preferences and innate behaviors of European perch (*Perca fluviatilis*) larvae. Furthermore, individuals exposed to microplastics do not respond to olfactory threat cues, which greatly increases predator-induced mortality rates. Our results demonstrate that microplastic particles operate both chemically and physically on larval fish performance and development.

2017

Science

# Editorial Retraction

**Jeremy Berg**

Editor-in-Chief

After an investigation, the Central Ethical Review Board in Sweden has recommended the retraction of the Report "Environmentally relevant concentrations of microplastic particles influence larval fish ecology," by Oona M. Lönnstedt and Peter Eklöv, published in *Science* on 3 June 2016 (*1*). *Science* ran an Editorial Expression of Concern regarding the Report on 1 December 2016 (*2*). The Review Board's report, dated 21 April 2017, cited the following reasons for their recommendation: (i) lack of ethical approval for the experiments; (ii) absence of original data for the experiments reported in the paper; (iii) widespread lack of clarity concerning how the experiments were conducted. Although the authors have told *Science* that they disagree with elements of the Board's report, and although Uppsala University has not yet concluded its own investigation, the weight of evidence is that the paper should now be retracted. In light of the Board's recommendation and a 28 April 2017 request from the authors to retract the paper, *Science* is retracting the paper in full.

**REFERENCES**

1. O. M. Lönnstedt, P. Eklöv, *Science* **352**, 1213 (2016).
2. J. Berg, *Science* **354**, 1242 (2016): published online 1 December 2016.

Published online 3 May 2017
10.1126/science.aan5763

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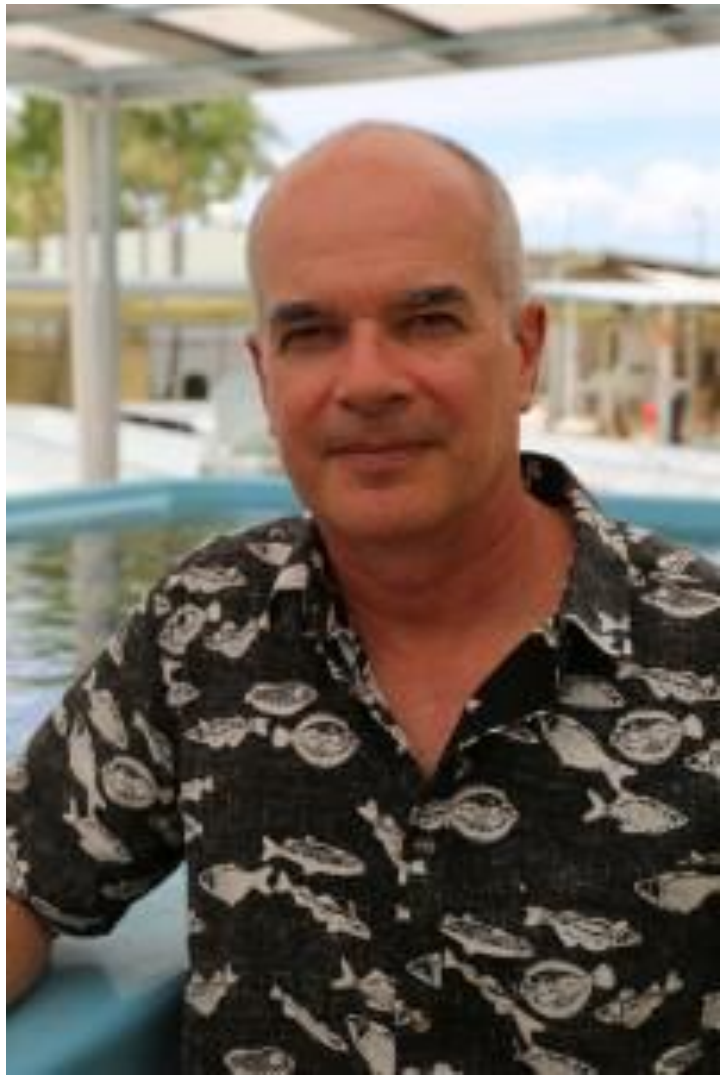
AUSTRALIA



**Philip Munday**
James Cook University

**Danielle Dixson**
University of Delaware

2010-2021

LETTER

# Ocean acidification disrupts the innate ability of fish to detect predator olfactory cues

Danielle L. Dixson,* Philip L. Munday and Geoffrey P. Jones

**Abstract**

While ocean acidification is predicted to threaten marine biodiversity, the processes that directly impact species persistence are not well understood. For marine species, early life

Functional Ecology

British Ecological Society

*Functional Ecology* 2012, **26**, 553–558 doi: 10.1111/j.1365-2435.2011.01951.x

# Effects of ocean acidification on visual risk assessment in coral reef fishes

Maud C. O. Ferrari*[,1], Mark I. McCormick[2], Philip L. Munday[2], Mark G. Meekan[3], Danielle L. Dixson[2], Oona Lönnstedt[2] and Douglas P. Chivers[4]

Selective mortality associated with variation in $CO_2$ tolerance in a marine fish

# Replenishment of fish populations is threatened by ocean acidification

Philip L. Munday[a,1], Danielle L. Dixson[a], Mark I. McCormick[a], Mark Meekan[b], Maud C. O. Ferrari[c], and Douglas P. Chivers[d]

## Fish from acidic ocean waters less able to smell predators

by Georgia Institute of Technology

## Carbon dioxide 'driving fish mad'

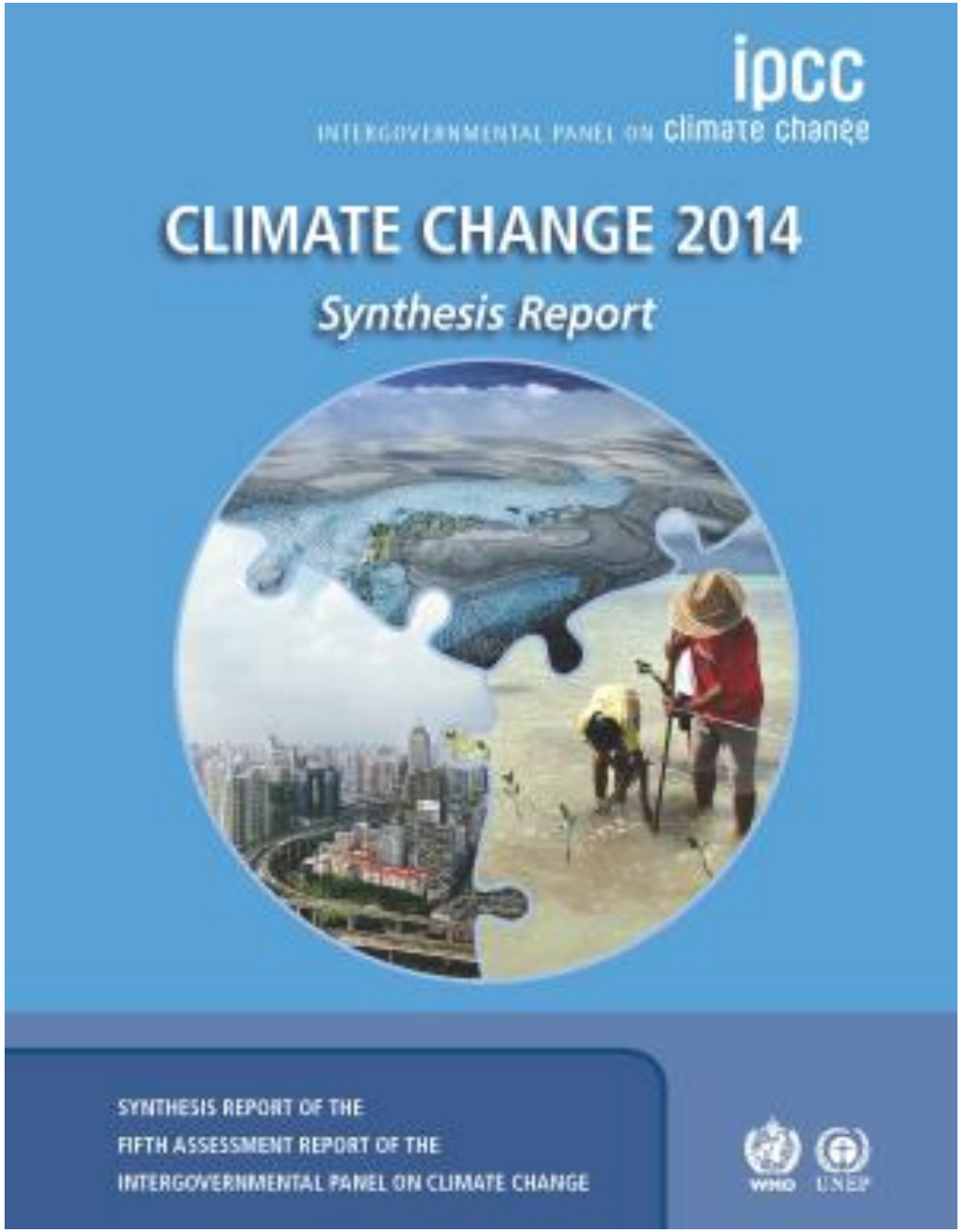
Fiona Macleod 13 Feb 2012

SCIENCE | NOT EXACTLY ROCKET SCIENCE

## Losing Nemo 2 – clownfish swim towards predators as CO2 levels rise

BY ED YONG

2014

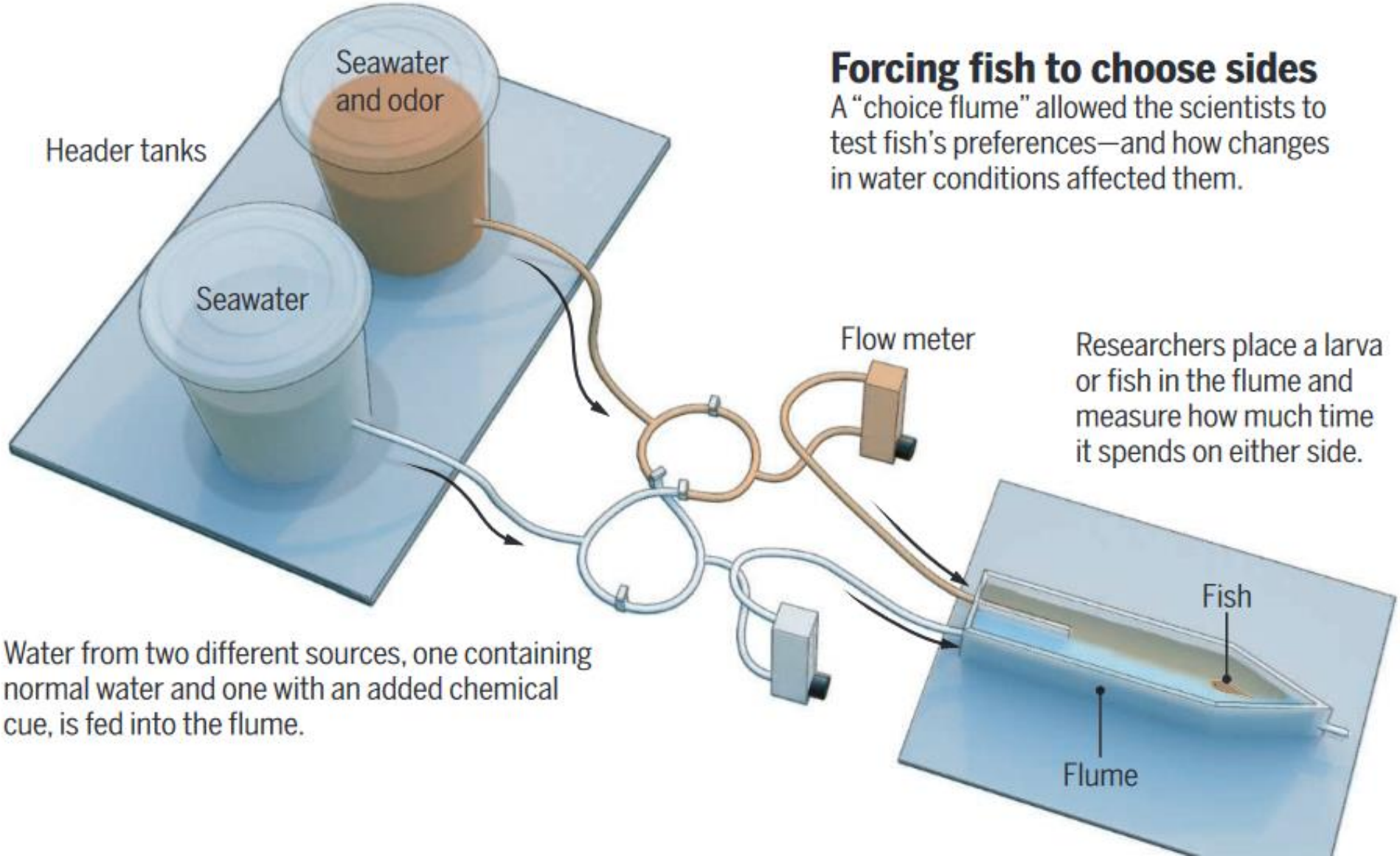

ipcc
INTERGOVERNMENTAL PANEL ON climate change
CLIMATE CHANGE 2014
Synthesis Report
SYNTHESIS REPORT OF THE
FIFTH ASSESSMENT REPORT OF THE
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
WMO
UNEP

# Oceans in the lab

Whistleblowers have raised questions about 22 papers, many of them lab studies about the effects of ocean acidification on fish behavior.

## Forcing fish to choose sides

A "choice flume" allowed the scientists to test fish's preferences—and how changes in water conditions affected them.




Water from two different sources, one containing normal water and one with an added chemical cue, is fed into the flume.

Researchers place a larva or fish in the flume and measure how much time it spends on either side.

# De klokkenluiders

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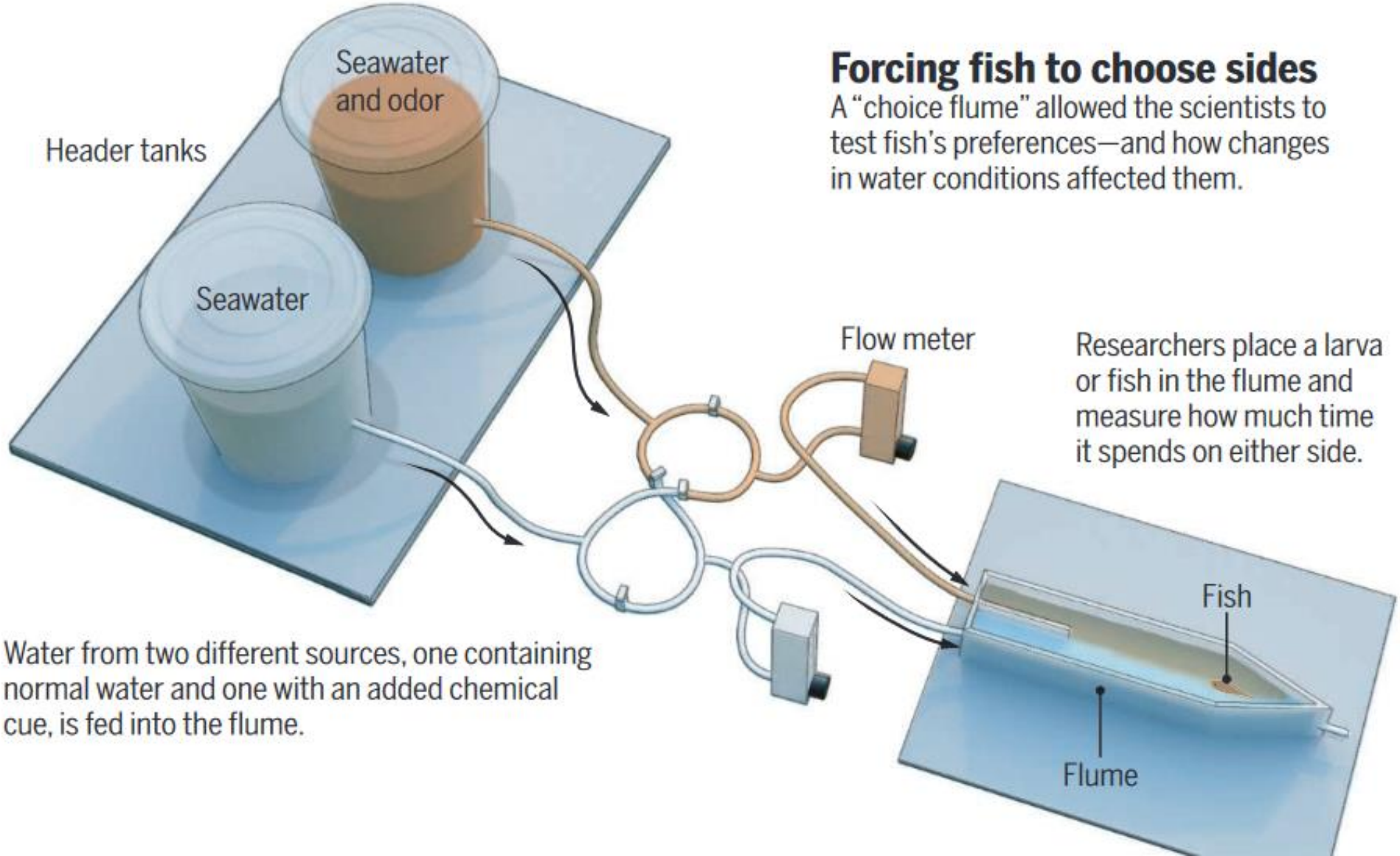


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2020

Article

# Ocean acidification does not impair the behaviour of coral reef fishes

https://doi.org/10.1038/s41586-019-1903-y

Received: 25 April 2019

Accepted: 21 November 2019

Timothy D. Clark[1]*, Graham D. Raby[2], Dominique G. Roche[3,4,5], Sandra A. Binning[4,5], Ben Speers-Roesch[6], Fredrik Jutfelt[7] & Josefin Sundin[7,8,9]*

The partial pressure of $CO_2$ in the oceans has increased rapidly over the past century, driving ocean acidification and raising concern for the stability of marine ecosystems[1–3]. Coral reef fishes are predicted to be especially susceptible to end-of-century ocean acidification on the basis of several high-profile papers[4,5] that have reported profound behavioural and sensory impairments—for example, complete attraction to the chemical cues of predators under conditions of ocean acidification. Here, we comprehensively and transparently show that—in contrast to previous studies—end-of-century ocean acidification levels have negligible effects on important behaviours of coral reef fishes, such as the avoidance of chemical cues from predators, fish activity levels and behavioural lateralization (left–right turning preference). Using data simulations, we additionally show that the large effect sizes and small within-group variances that have been reported in several previous studies are highly improbable. Together, our findings indicate that the reported effects of ocean acidification on the behaviour of coral reef fishes are not reproducible, suggesting that behavioural perturbations will not be a major consequence for coral reef fishes in high $CO_2$ oceans.

2020

Studies of reef fish like these in Australia suggested acidification might leave them disoriented and vulnerable.
DAVID DOUBILET/NATIONAL GEOGRAPHIC IMAGE COLLECTION

# Analysis challenges slew of studies claiming ocean acidification alters fish behavior

2014

Breaking the cell cycle to treat cancer p. 868
Watching metal atoms order and organize pp. 909 & 805
Enhancer dynamics in blood development p. 842
Science
AAAS
Fostering reef recovery
Young corals and fishes colonize healthy habitats pp. 809 & 892

2014



RESEARCH ARTICLES

REEF ECOLOGY

# Chemically mediated behavior of recruiting corals and fishes: A tipping point that may limit reef recovery

Danielle L Dixson,[1] David Abrego,[2] Mark E Hay[1]*

Coral reefs are in global decline, converting from dominance by coral to dominance by seaweed. Once seaweeds become abundant, coral recovery is suppressed unless herbivores return to remove seaweeds, and corals then recruit. Variance in the recovery of fishes and corals is not well understood. We show that juveniles of both corals and fishes are repelled by chemical cues from fished, seaweed-dominated reefs but attracted to cues from coral-dominated areas where fishing is prohibited. Chemical cues of specific seaweeds from degraded reefs repulsed recruits, and cues from specific corals that are typical of healthy reefs attracted recruits. Juveniles were present at but behaviorally avoided recruiting to degraded reefs dominated by seaweeds. For recovery, degraded reefs may need to be managed to produce cues that attract, rather than repel, recruiting corals and fishes.

Corals are foundation species, creating the biogenic matrix on which reef structure, function, and biodiversity depend (*1*, *2*). However, corals are in decline. Coral cover has declined by 80% in the Caribbean and

processes preventing juvenile recruitment (*10*–*12*). Some seaweeds chemically reduce the recruitment and survival of corals for centimeters around seaweed perimeters (*15*), possibly selecting for coral larvae that use chemical cues to reject

swell, and presumably other physical conditions (fig. S1). Our non-MPA reefs have higher seaweed and lower coral cover than many nonprotected reefs, but some unprotected reefs in the Caribbean (*5*), Red Sea (*17*), and Indian Ocean (*18*) are similar in seaweed and coral cover, and numerous reefs are trending toward the conditions on our non-MPA reefs (*3*, *4*). Thus, the contrasts of juvenile fish and coral behavior toward the divergent reef states we investigated may be informative about some present and numerous future reefs.

## Responses of coral larvae

Coral larvae discriminate among environments, as shown by their behavior in response to different waters (*19*), substrates (*20*), settlement-inducing crustose coralline algae (*21*), or biofilms (*22*). Additionally, some seaweeds chemically suppress the settlement and survival of coral larvae within centimeters of their thalli (*15*). The low survival of coral recruits at sites occupied by certain competitors (*23*) suggests that the avoidance of specific competitors by settling larvae could be adaptive. If so, chemically mediated larval behavior could affect recruitment densities and reef resilience.

To test this possibility, we exposed larvae of corals within the genus *Acropora* to cues from divergent environments. Acroporid corals are major providers of topographic complexity, which is negatively related to algal cover and positively related to fish density, biomass, diversity, and

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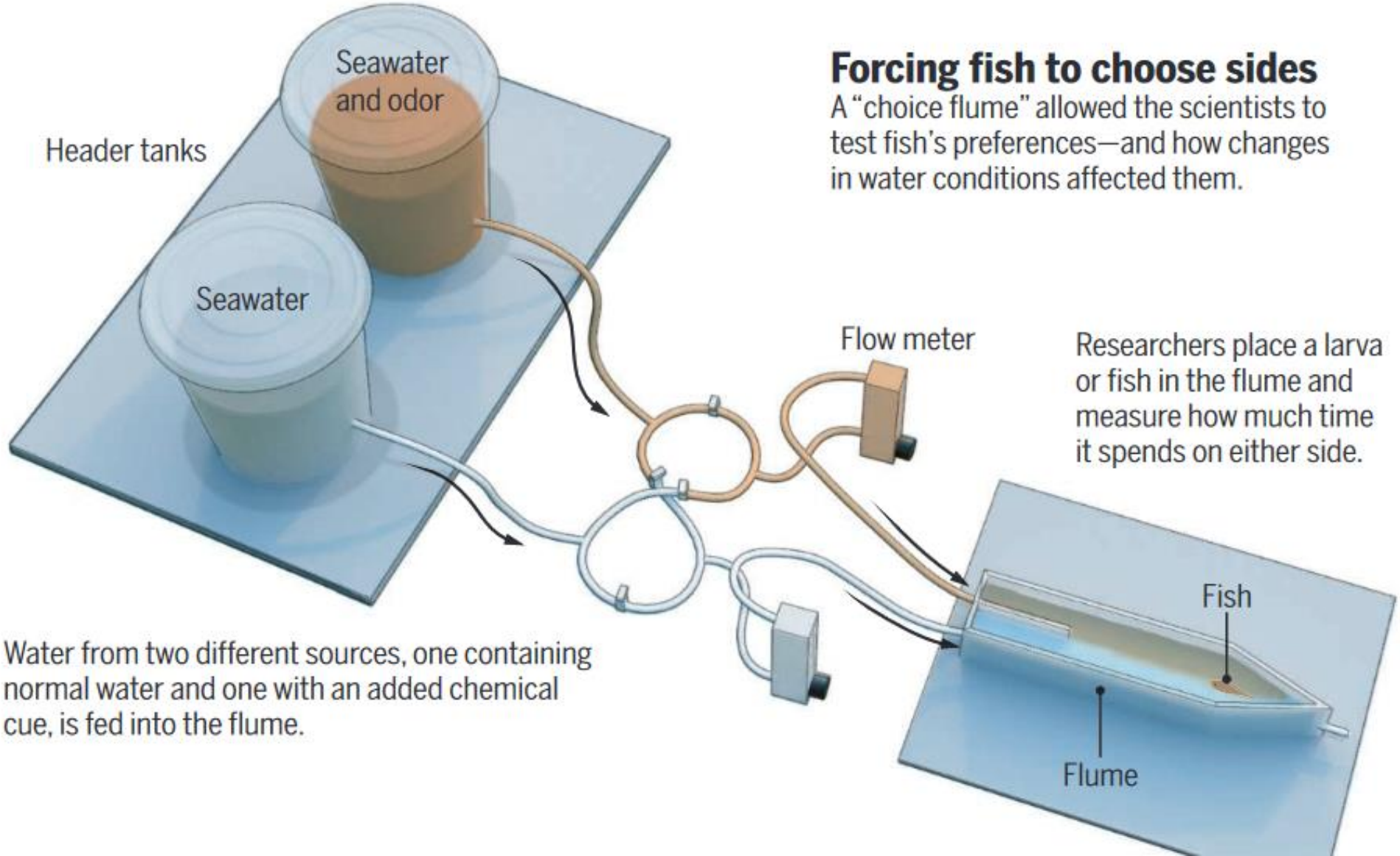


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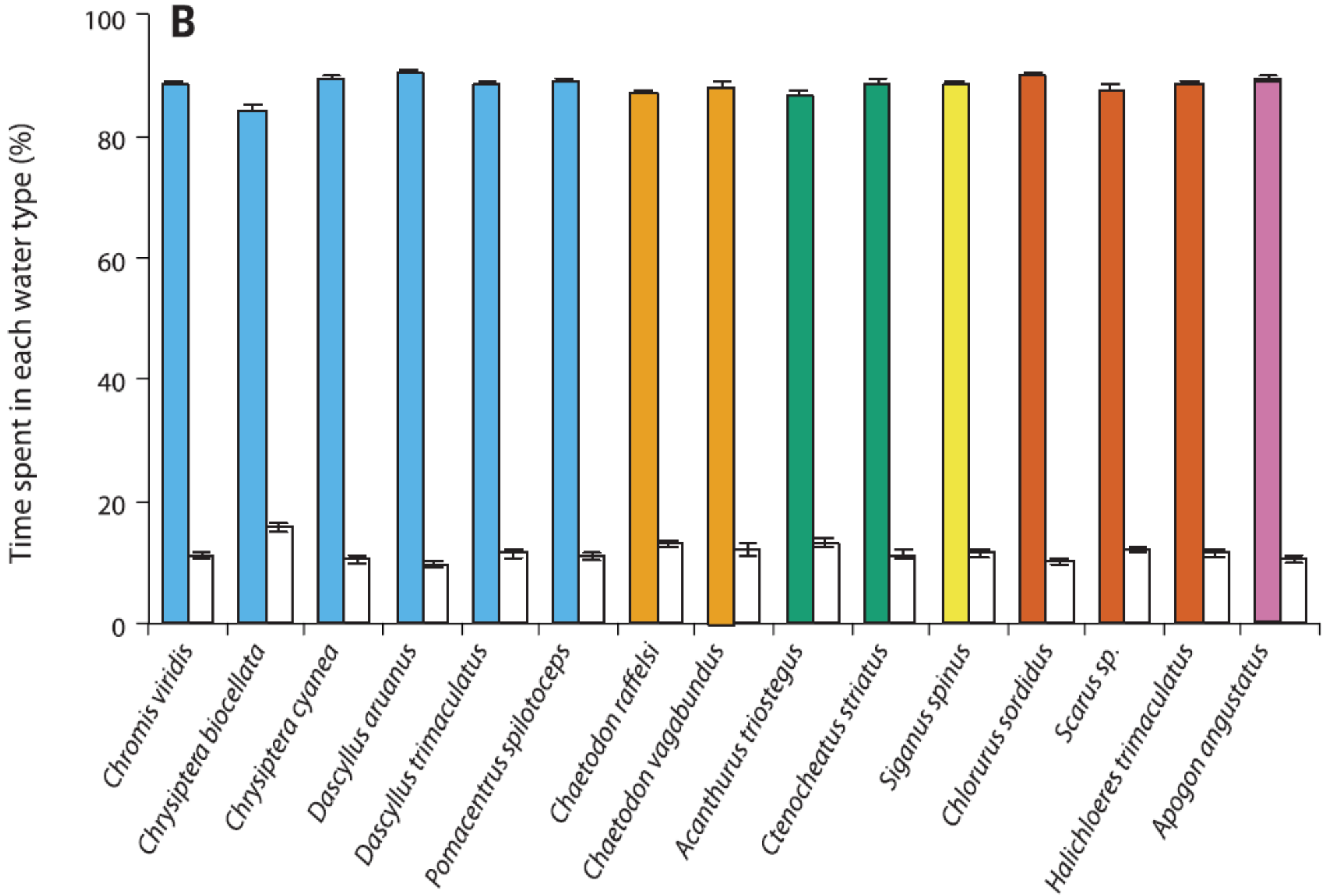
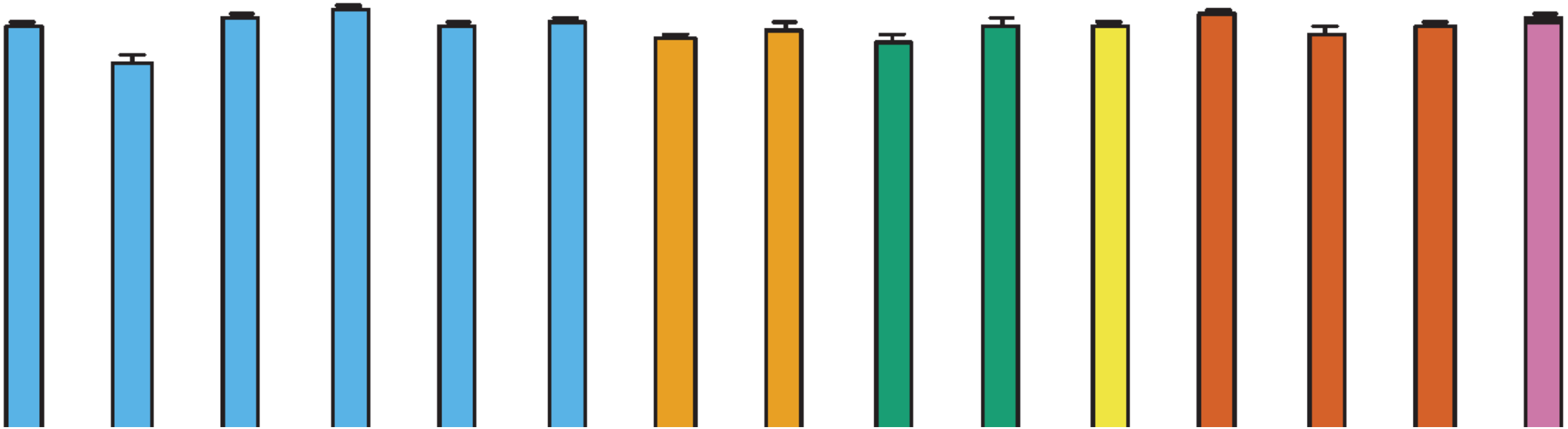
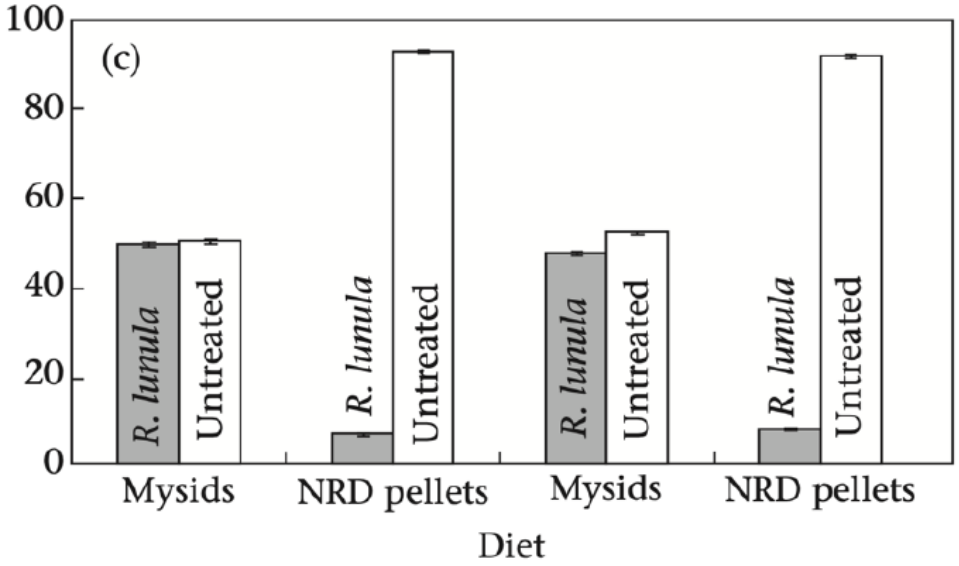

B
Time spent in each water type (%)
100
80
60
40
20
0
Chromis viridis
Chrysiptera biocellata
Chrysiptera cyanea
Dascyllus aruanus
Dascyllus trimaculatus
Pomacentrus spilotoceps
Chaetodon raffelsi
Chaetodon vagabundus
Acanthurus triostegus
Ctenocheatus striatus
Siganus spinus
Chlorurus sordidus
Scarus sp.
Halichloeres trimaculatus
Apogon angustatus




(c)
100
80
60
40
20
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R. lunula
Untreated
R. lunula
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R. lunula
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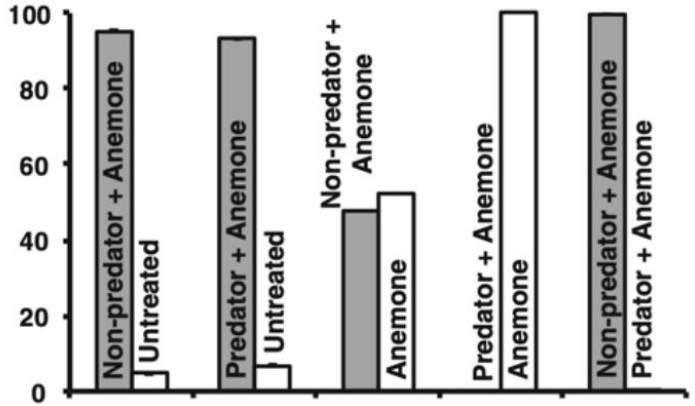
Untreated
Mysids
NRD pellets
Mysids
NRD pellets
Diet


100
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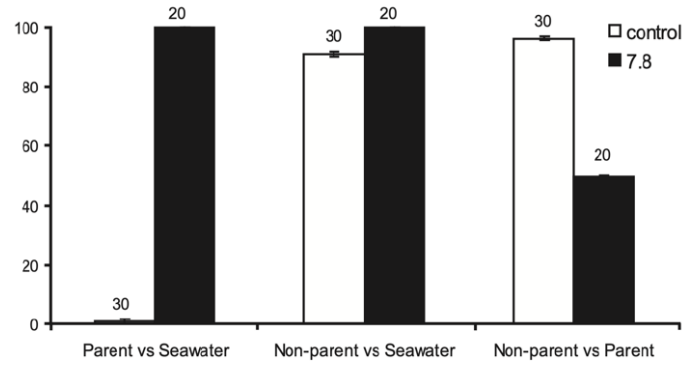
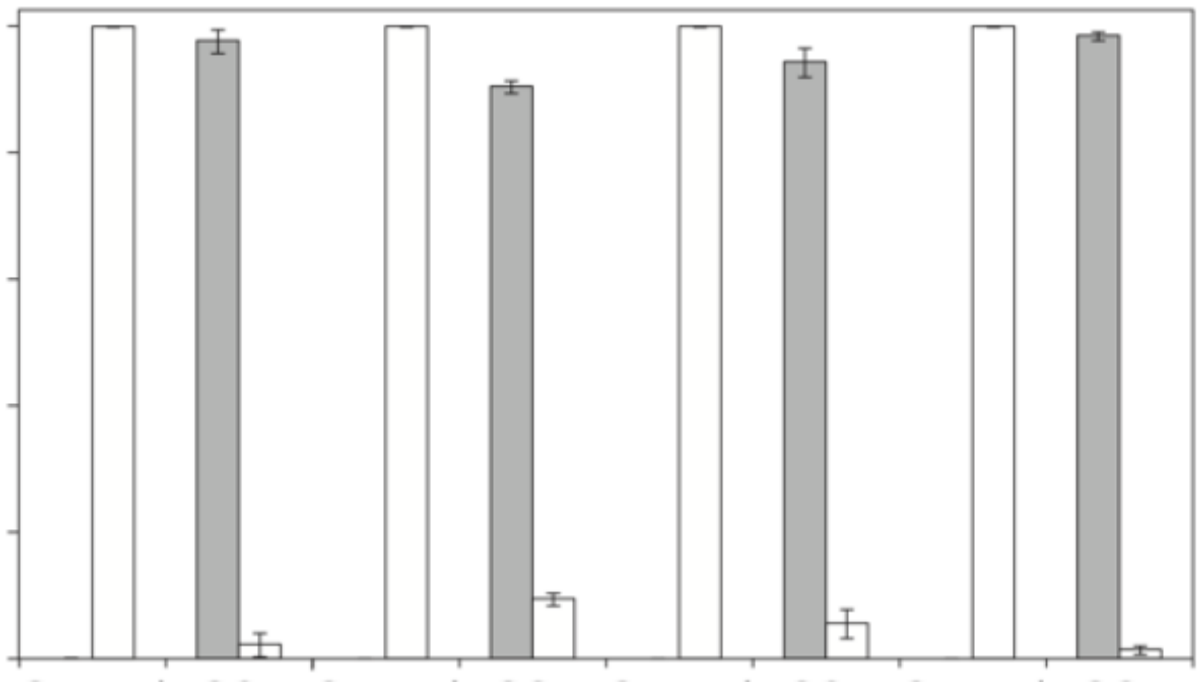
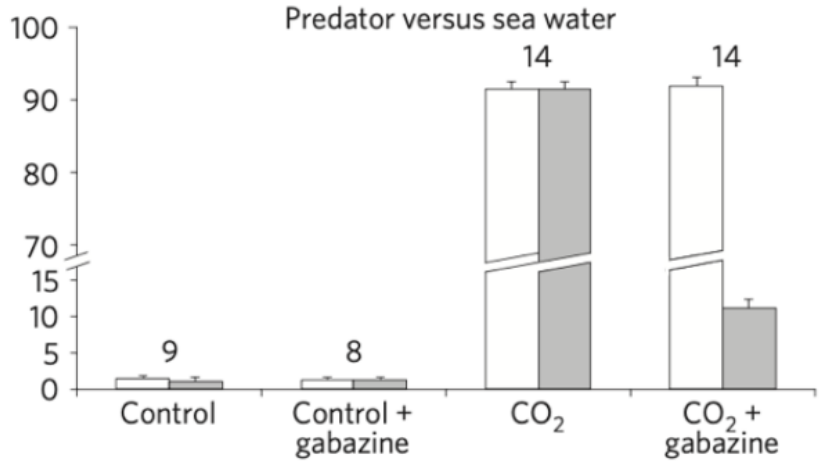
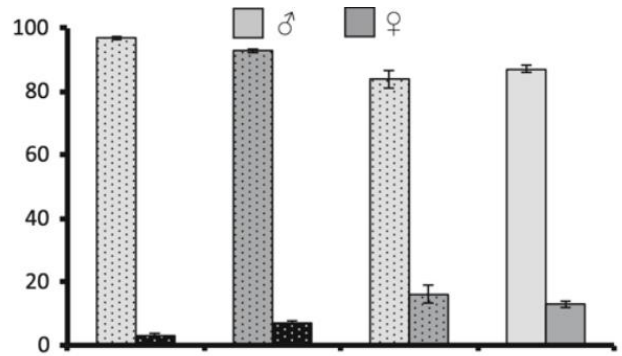
20
0
Non-predator + Anemone
Untreated
Predator + Anemone
Untreated
Non-predator + Anemone
Anemone
Predator + Anemone
Anemone
Non-predator + Anemone
Predator + Anemone


100
80
60
40
20
0
30
20
30
20
30
20
control
7.8
Parent vs Seawater
Non-parent vs Seawater
Non-parent vs Parent




Predator versus sea water
100
90
80
70
15
10
5
0
9
8
14
14
Control
Control + gabazine
CO2
CO2 + gabazine


♂
♀
100
80
60
40
20
0

| Location Captured | Species | n | MPA (Votualalai) | Non-MPA (Votualalai) | Non-MPA (Votualalai) | MPA (Votualalai) | Score | Indivd. Average |
|---|---|---|---|---|---|---|---|---|
| Votualalia MPA | Chromis viridis | 20 | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 19 | 5 | 4 | 20 | 39 | 81.25 |
| | | | 21 | 3 | 3 | 21 | 42 | 87.5 |
| | | | 22 | 2 | 5 | 19 | 41 | 85.41666667 |
| | | | 23 | 1 | 4 | 20 | 43 | 89.58333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 23 | 1 | 2 | 22 | 45 | 93.75 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 21 | 3 | 3 | 21 | 42 | 87.5 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 23 | 1 | 3 | 21 | 44 | 91.66666667 |
| | | | 22 | 2 | 1 | 23 | 45 | 93.75 |
| | | | 21 | 3 | 4 | 20 | 41 | 85.41666667 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | | | | | Mean | 88.22916667 |
| | | | | | | | SD | 3.899024751 |
| | | | | | | | SE | 0.871848439 |

| Location Captured | Species | n | MPA (Votualalai) | Non-MPA (Votualalai) | Non-MPA (Votualalai) | MPA (Votualalai) | Score | Indivd. Average |
|---|---|---|---|---|---|---|---|---|
| Votualalia non-MPA | Chromis viridis | 20 | 22 | 2 | 5 | 19 | 41 | 85.41666667 |
| | | | 19 | 5 | 2 | 22 | 41 | 85.41666667 |
| | | | 21 | 3 | 4 | 20 | 41 | 85.41666667 |
| | | | 22 | 2 | 3 | 21 | 43 | 89.58333333 |
| | | | 23 | 1 | 4 | 20 | 43 | 89.58333333 |
| | | | 21 | 3 | 5 | 19 | 40 | 83.33333333 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 23 | 1 | 2 | 22 | 45 | 93.75 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 21 | 3 | 3 | 21 | 42 | 87.5 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 23 | 1 | 3 | 21 | 44 | 91.66666667 |
| | | | 22 | 2 | 1 | 23 | 45 | 93.75 |
| | | | 21 | 3 | 4 | 20 | 41 | 85.41666667 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | | | | | Mean | 87.91666667 |
| | | | | | | | SD | 3.73901901 |
| | | | | | | | SE | 0.836070068 |

| Location Captured | Species | n | MPA (Votualalai) | Non-MPA (Votualalai) | Non-MPA (Votualalai) | MPA (Votualalai) | Score | Indivd. Average |
|---|---|---|---|---|---|---|---|---|
| Namada MPA | Chromis viridis | 20 | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 19 | 5 | 4 | 20 | 39 | 81.25 |
| | | | 21 | 3 | 3 | 21 | 42 | 87.5 |
| | | | 22 | 2 | 5 | 19 | 41 | 85.41666667 |
| | | | 23 | 1 | 4 | 20 | 43 | 89.58333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 23 | 1 | 2 | 22 | 45 | 93.75 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 21 | 3 | 3 | 21 | 42 | 87.5 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 23 | 1 | 3 | 21 | 44 | 91.66666667 |
| | | | 22 | 2 | 1 | 23 | 45 | 93.75 |
| | | | 21 | 3 | 4 | 20 | 41 | 85.41666667 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | | | | | Mean | 88.22916667 |
| | | | | | | | SD | 3.899024751 |
| | | | | | | | SE | 0.871848439 |

| Location Captured | Species | n | MPA (Votualalai) | Non-MPA (Votualalai) | Non-MPA (Votualalai) | MPA (Votualalai) | Score | Indivd. Average |
|---|---|---|---|---|---|---|---|---|
| Namada non-MPA | Chromis viridis | 20 | 22 | 2 | 3 | 21 | 43 | 89.58333333 |
| | | | 19 | 5 | 2 | 22 | 41 | 85.41666667 |
| | | | 21 | 3 | 5 | 19 | 40 | 83.33333333 |
| | | | 22 | 2 | 1 | 23 | 45 | 93.75 |
| | | | 23 | 1 | 2 | 22 | 45 | 93.75 |
| | | | 21 | 3 | 5 | 19 | 40 | 83.33333333 |
| | | | 20 | 4 | 1 | 23 | 43 | 89.58333333 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 23 | 1 | 3 | 21 | 44 | 91.66666667 |
| | | | 20 | 4 | 1 | 23 | 43 | 89.58333333 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 21 | 3 | 2 | 22 | 43 | 89.58333333 |
| | | | 21 | 3 | 3 | 21 | 42 | 87.5 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | 20 | 4 | 4 | 20 | 40 | 83.33333333 |
| | | | 23 | 1 | 3 | 21 | 44 | 91.66666667 |
| | | | 22 | 2 | 1 | 23 | 45 | 93.75 |
| | | | 21 | 3 | 4 | 20 | 41 | 85.41666667 |
| | | | 22 | 2 | 2 | 22 | 44 | 91.66666667 |
| | | | | | | | Mean | 88.95833333 |
| | | | | | | | SD | 3.708345653 |
| | | | | | | | SE | 0.829211297 |

2021

# SEA OF DOUBTS

## Dozens of papers linking high carbon dioxide to unsettling changes in fish behavior fall under suspicion

By Martin Enserink

Orange clownfishare among the tropical species studied in 22 papers now facing scrutiny.

When Philip Munday discussed his research on ocean acidification with more than 70 colleagues and students in a December 2020 Zoom meeting, he wasn't just giving a confident overview of

vision in 2012 and has since become a successful lab head at the University of Delaware (UD), Lewes.

In 2009, Munday and Dixson began to publish evidence that ocean acidification—a knock-on effect of the rising carbon dioxide ($CO_2$) level in Earth's atmosphere—has

tists, led by fish physiologist Timothy Clark of Deakin University in Geelong, Australia, published a *Nature* paper reporting that in a massive, 3-year study, they didn't see these dramatic effects of acidification on fish behavior at all.

The paper has proved so polarizing in the

rication, they did say "methodological or analytical weaknesses" might have led to irreproducible results. And many in the research community knew the seven authors take a strong interest in sloppy science and fraud—they had blown the whistle on a 2016 *Science* paper by another former Ph.D.

asked three funders that together spent millions on Dixson's and Munday's work—the Australian Research Council (ARC), the U.S. National Science Foundation (NSF), and the U.S. National Institutes of Health (NIH)—to investigate possible fraud in 22 papers.

The request, which they shared with a *Science* reporter, rests on what they say is evidence of manipulation in publicly available raw data files for two papers, one published in *Science*, the other in *Nature Climate Change*, combined with remarkably large and "statistically impossible" effects from $CO_2$ reported in many of the other papers. They also provided testimony from former members of the Dixson and Munday labs, some of whom monitored Dixson's activities and concluded she made up data.

ARC and NSF declined to discuss the case with *Science*, but said they generally refer such cases to the research institutions—in this case JCU; the Georgia Institute of Technology, where Dixson worked between 2011 and 2015; and UD. NIH said it refers cases to the U.S. Office of Research Integrity, which does not comment on cases.

Munday calls the allegations of fraud "abhorrent" and "slanderous," and a JCU spokesperson says the university has dismissed the allegations after a preliminary investigation. (Munday retired from JCU in April and has moved to Tasmania, but emphasizes there is no connection between that timing and the allegations.) UD says it cannot comment on personnel matters; a Georgia Tech spokesperson declined to comment except to say the institute "takes all allegations of research misconduct seriously." Dixson denies making up data as well. "I fully stand by all the data I've collected, I stand by the papers that we've published," she told *Science* in a February interview. "The data was collected with integrity. I mean, I preach that to my students."

But multiple scientists and data experts unconnected to the Clark group who reviewed the case at *Science*'s request flagged a host of problems in the two data sets, and one of them found what he says are serious

Published by AAAS on November 12, 2021

2021

group" in the past. "Building a career on judging what other people did is not right," says Pörtner, who co-chairs one of IPCC's three working groups. "If such a controversy gets outside of the community, it's harmful because the whole community loses credibility."

2021

**Brian Nosek**
@BrianNosek

For those following episodes involving replication, potential fraud, and heated academic debate, this story will feel familiar. It is nevertheless riveting and highlights the deep challenges of assessing credibility, of researchers and findings.

**Boris Barbour** @BorisBarbour · May 6

I'm impressed with the transparency of @ScienceMagazine in questioning in honest terms some of the glittering careers they helped create. @martinenserink has done a terrific job.

**Michael E. Mann**
@MichaelEMann

Thanks for your work —you've done a real service to the scientific community here Fredrik.

2021

Fraude vermoed in DNA barcoding studie

# When his suspicions went unanswered, this biologist decided to disavow his own study

Scientist blows whistle on prominent co-author: "I don't want to deal with this alone anymore"

15 JUN 2021 • BY MARTIN ENSERINK

2021

Original Paper | Published: 19 March 2014

# RETRACTED ARTICLE: Molecular taxonomic tools provide more accurate estimates of species richness at less cost than traditional morphology-based taxonomic practices in a vegetation survey

Ken A. Thompson & Steven G. Newmaster

*Biodiversity and Conservation* **23**, 1411–1424 (2014) | Cite this article

**1953** Accesses | **25** Citations | **21** Altmetric | Metrics

This article was retracted on 27 October 2021

This article has been updated

## Abstract

Vegetation surveys are conducted to obtain a catalogue of the plant species that occupy an area

2020

‘Spider-gate’

# Spider biologist denies suspicions of widespread data fraud in his animal personality research

Behavioral ecologists are in turmoil as dozens of research papers involving an expert on social spiders draw scrutiny

31 JAN 2020 • BY ELIZABETH PENNISI

# Is het echt zo’n zootje?

PAGES

How you can support Retraction Watch

Meet the Retraction Watch staff

About Adam Marcus

About Ivan Oransky

# IEEE retracts plagiarized paper after Retraction Watch inquiries

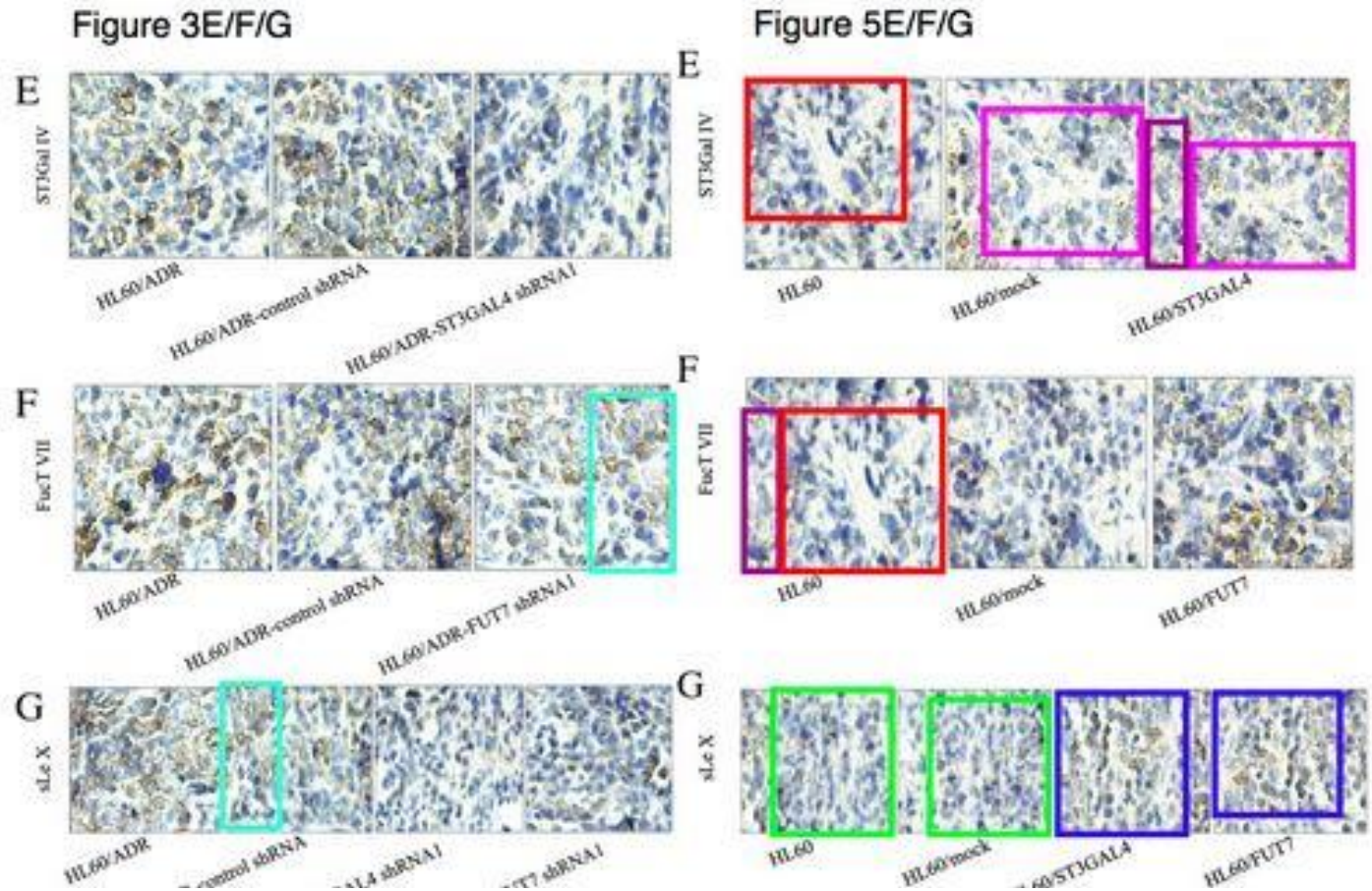
The Institute of Electrical and Electronic Engineers (IEEE) has retracted a paper it published in 2006 that was identical to another paper

NEWS FEATURE | 13 May 2020

# Meet this super-spotter of duplicated images in science papers

Elisabeth Bik quit her job to spot errors in research papers — and has become the public face of image sleuthing.

PUBPEER




# PubPeer strikes again: Leukemia paper retracted for image duplications

NIEUWS

# Groot onderzoek naar academische integriteit: ‘Ruim helft Nederlandse wetenschappers zoekt grens op van toelaatbare’

Meer dan de helft van de wetenschappers in Nederland geeft toe in zijn of haar werk regelmatig de grenzen van het toelaatbare op te zoeken. Een op de twaalf zegt de afgelopen drie jaar zelfs wel eens onderzoeksresultaten verzonnen of aangepast te hebben.

**Jop de Vrieze** 8 juli 2021, 11:58

## Anonimiteit

De 8 procent wetenschapsfraude is flink hoger dan in eerdere studies. Een verklaring hiervoor is dat de onderzoekers bij hun enquête een techniek toepasten die de anonimiteit verhoogt. Tegelijk zou de grofweg 50 procent die zich schuldig maakt aan 'bedenkelijke praktijken' nog wel eens een onderschatting kunnen zijn, zegt Daniele Fanelli, wetenschapsethicus aan de London School of Economics en niet betrokken bij het onderzoek.

# Waarom

frauderen wetenschappers?

- **De beloning is hoog:**

    - Makkelijk publiceren in goede tijdschriften
    - Beurzen
    - Banen
    - Media-aandacht

- **De beloning is hoog:**

    - Makkelijk publiceren in goede tijdschriften
    - Beurzen
    - Banen
    - Media-aandacht

- **De pakkans is laag:**

    - Journals zjin op zoek naar spannende resultaten
    - Reviewers letten niet op
    - Universiteiten hebben weinig zin om zaken te onderzoeken

# Wat wordt er aan gedaan?

- Ruwe data beschikbaar laten maken
- Allesop video vastleggen
- ‘Open Science’
- PubPeer
- Replicatie-onderzoek
- Fraudebeschuldigingen serieuzer onderzoeken
- Publicatiedruk verminderen

# Moeten we hier iets mee in de biologieles?

# Ja:

# Ja:

1. In de VWO-biologieles moet wetenschapsfraude aan de orde komen

# Ja:

1. In de VWO-biologieles moet wetenschapsfraude aan de orde komen

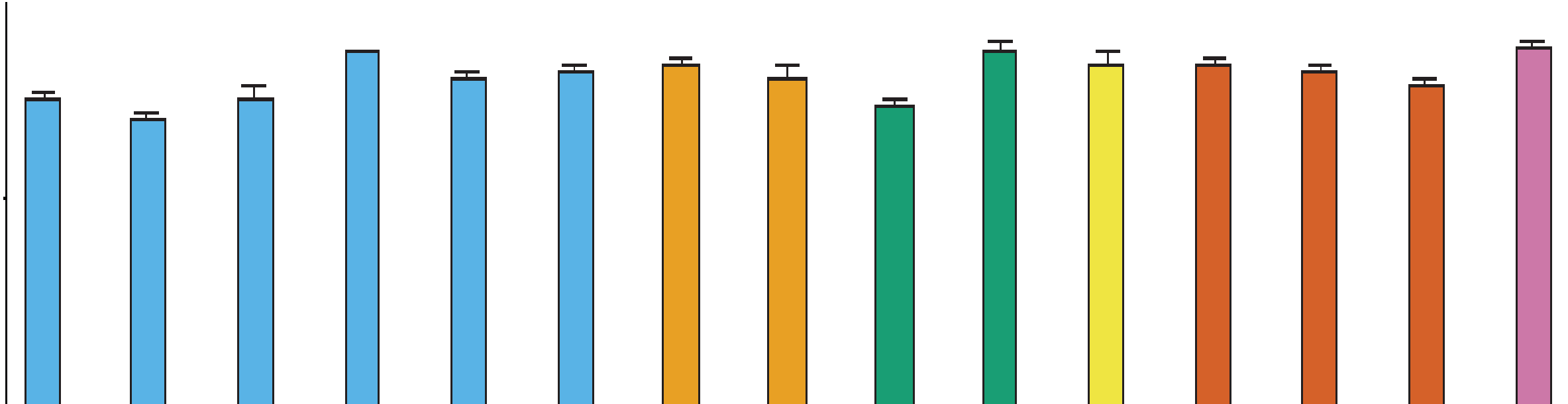
2. Biologiepractika hebben geen 'foute' uitkomsten

# Ja:

1. In de VWO-biologieles moet wetenschapsfraude aan de orde komen

2. Biologiepractika hebben geen 'foute' uitkomsten

3. Docenten moeten datafraude van leerlingen opsporen

# Bedankt!

martin@enserink.net