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The Science People See on Social Media

Science-related Facebook pages draw millions of followers but feature more posts with 'news you can use' or ads than scientific discoveries

BY *Paul Hitlin and Kenneth Olmstead*

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Science-related Facebook pages draw millions of followers but feature more posts with 'news you can use' or ads than scientific discoveries

Millions of people see science-related information on their Facebook feeds or elsewhere on social media, but the kinds of science stories people most likely encounter are often practical tips with "news you can use" or promotions for programs and events rather than new developments in the science, engineering and technology world.

In an effort to better understand the science information that social media users encounter on these platforms, Pew Research Center systematically analyzed six months' worth of posts from 30 of the most followed science-related pages on Facebook. These science-related pages included 15 popular Facebook accounts from established "multiplatform" organizations – for example National Geographic and the Discovery Channel – along with 15 popular "Facebook-primary" accounts from individuals *or* organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet.

Some of the key findings from this analysis:

Millions of people follow science-related pages on Facebook. Multiplatform organizations have taken advantage of Facebook's capacity to reach large numbers of followers on a new platform. For instance, as of June 2017, National Geographic had 44.3 million Facebook

Science-related Facebook pages draw millions of followers

30 science-related pages
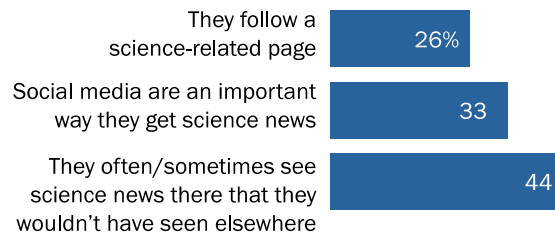were identified in this study

130,932 posts
were estimated to be from these 30 science-related pages in 2017

44 million social media users
follow the largest page, while each page has at least 3 million followers

% of social media users in the U.S. who say ...

They follow a science-related page	26%
Social media are an important way they get science news	33
They often/sometimes see science news there that they wouldn't have seen elsewhere	44

But only about three-in-ten posts feature new scientific discoveries

Of the 30 science-related pages, % of posts in 2017 featuring ...

All other frames 34 — **29%** New discoveries
Ads/promotions 16 — 21 'News you can use'
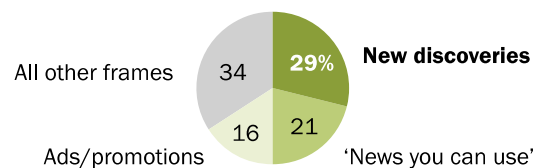
Notes: The number of posts in 2017 is estimated by doubling the number of posts from the first six months of the year due to missing data in Facebook's API.
Source: Pew Research Center analysis of Facebook posts from 30 science-related pages. Survey of U.S. adults conducted May 30-June 12, 2017.
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followers, Discovery had 39 million and Animal Planet had 20 million. (See the Appendix for more details about the nature of these pages.) [1]

At the same time, "Facebook-primary" pages have arisen in a relatively short time and built impressive audiences. This illustrates the degree to which social media have transformed the media landscape, making it easier and cheaper for those with few resources to provide unmediated content and garner followings. For example, a single enterprising writer built the Facebook page IFLScience in 2012, which has grown to 25.6 million followers and a staff of approximately 15. Social media have also provided a platform for prominent science figures such as Stephen Hawking[2] (followed by 3.9 million users on Facebook as of June 2017), Bill Nye (followed by 4.8 million) and Neil deGrasse Tyson (followed by 4 million).

New scientific discoveries are covered in 29% of the posts on these pages. Each of these 30 science-related pages has its own distinctive flavor. Still, a

These 30 science-related Facebook pages each have 3 million to 44 million followers as of 2017

The number of page likes for each Facebook page as of June 2017

Facebook-primary		Multiplatform	
IFLScience	25.6	National Geographic	44.3
Health Digest	11.1	Discovery	39
David Wolfe	10.9	Animal Planet	20
ScienceAlert	9.1	NASA	19.4
Hashem Al-Ghaili (@ScienceNaturePage)	8.4	NASA Earth	9.6
Interesting Engineering	7.4	Women's Health	8.2
Smart is the New Sexy (@enjoy.science)	7.3	Psychology Today	7.5
Dr. Mehmet Oz	6	Science Channel	7.4
Bill Nye	4.8	MythBusters	6.8
Neil deGrasse Tyson	4	BBC Earth	6.8
Stephen Hawking	3.9	Health	6.6
ScienceDump	3.6	New Scientist	3.6
mindbodygreen	3.2	Science magazine	3.5
Daily Health Tips	3.1	Popular Science	3.5
Dr. Michio Kaku	3	Physics Today	3

Note: Number of page likes as of June 12, 2017. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.

Source: Pew Research Center analysis of 30 science-related Facebook pages.

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[1] Figures for the number of followers come from Facebook's official statistics. In this report, the term "follower" is used interchangeably with the number of users who "like" a page using the thumbs up icon. It's possible these numbers are inflated for some or all of these pages because of automated accounts, known as bots.
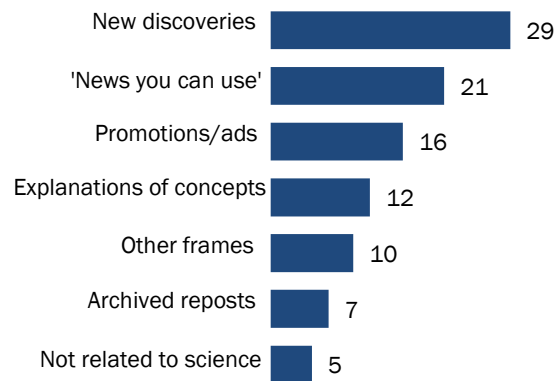
[2] This study was conducted prior to Hawking's passing in March 2018.

few common themes emerged from a detailed content analysis of a random sample of 6,582 posts published in the first half of 2017.

While these 30 Facebook pages with a self-described focus on a science-related area cover a range of topics, just 29% of the Facebook posts from these pages had a focus or "frame" around information about new scientific discoveries. Some pages used a new-discovery frame in the bulk of their posts. For example, that was true of ScienceAlert, IFLScience, NASA Earth and New Scientist. But that framing was rare on other pages. Across the 30 pages, other frames were evident when researchers coded a representative sample of the posts. Fully 21% of posts featured the practical applications of science information, relying on a "news you can use" frame. Another 16% of posts were promotions or advertisements for media or events, 12% of posts were aimed at explaining a science-related concept, and the remainder used some other frame.

About three-in-ten posts across top science-related Facebook pages feature new scientific discoveries

% of Facebook posts on 30 science-related pages using each frame

Frame	%
New discoveries	29
'News you can use'	21
Promotions/ads	16
Explanations of concepts	12
Other frames	10
Archived reposts	7
Not related to science	5

Source: Pew Research Center analysis of a random sample of Facebook posts from 30 popular science-related pages, January to June 2017. Data from the public Facebook Graph API.
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The volume of posts from these science-related pages has increased over the past few years, especially among multiplatform pages. On average, the 15 popular multiplatform Facebook pages have increased their production of posts by 115% since 2014, compared with a 66% increase among Facebook-primary pages over the same time period.

The average number of user interactions per post – a common indicator of audience engagement based on the total number of shares, comments, and likes or other reactions – tends to be higher for posts from Facebook-primary accounts than posts from multiplatform accounts. From January 2014 to June 2017, Facebook-primary pages averaged 14,730 interactions per post, compared with 4,265 for posts on multiplatform pages. This relationship held up even when controlling for the frame of the post.

Higher engagement is seen on posts focused on visuals with little additional information. Other posts with relatively high engagement include calls to action and posts dealing with science

funding. Analysis of the types of posts yielding the highest average of interactions shows that visual posts with little or no text tend to yield more audience engagement than most other frames. Additionally, posts with an explicit call to action produce high numbers of interactions. However, such posts are quite rare, comprising just 2% of all posts across the 30 pages. And, posts on Facebook-primary pages related to federal funding for agencies with a significant scientific research mission were particularly engaging, averaging more than 122,000 interactions per post in the first half of 2017.

The most-engaging posts from either Facebook-primary or multiplatform pages during this period included a wide range of topics and frames. Video was a common feature of these highly engaging posts whether they were aimed at explaining a scientific concept, highlighting new discoveries, or showcasing ways people can put science information to use in their lives.

Highly engaging posts among these pages did not always feature science-related information. Four of the top 15 most-engaging posts from Facebook-primary pages featured inspirational sayings or advice such as "look after your friends" or "believe in yourself." And, the single most-engaging post among the multiplatform pages was an expression of support for those in Paris after a terrorist attack.

There is considerable variation in what topics these popular Facebook science-related pages focus on. Most pages in this sample specialized on posts connected with just one or two science topics. For example, pages such as Daily Health Tips and Health Digest focused a majority of their content on health and medicine topics, while NASA for the most part posted content related to astronomy and physics. Only four of the 30 pages covered a roughly even mix of posts on several topics, with no single topic making up more than one-in-five posts on the account.

These findings emerge as more and more material on all kinds of subjects is posted and disseminated on social media. A 2017 Pew Research Center survey found most social media users in the U.S. report seeing science-related posts and a third (33%) consider it an important way they get science news. Some 44% of social media users say they see content unique to that platform at least sometimes, and 26% of users report that they follow a science-related page or account. Other Pew Research Center surveys show that Facebook is used by a far larger share than other social media platforms.

It is important to note that for the purposes of this analysis the selection of "science-related" pages was based on each page's self-statement that it covers content about science or about a major area connected with science, technology, engineering or math. (Pages focused primarily on commercial or advocacy missions were excluded.) The set of 30 covers a broad range of pages available to

social media users, including several that are widely seen in the scientific community as offering questionable or even "pseudoscientific" advice or information.

As concerns about public understanding and acceptance of scientific evidence have increased over the past few years, this analysis provides a window into the sources of information that – while may differ from consensus views in the scientific community – have, nonetheless, attracted millions of followers and more who see posts from these pages in their Facebook news feed even without following the page. As such, these data help better understand the sources of information that may influence public views and understanding of science-related issues.

Science-related Facebook pages are posting more often, especially multiplatform pages

In just a few years, the volume of posts produced by this set of science-related pages has grown dramatically, particularly among multiplatform pages. The 15 multiplatform pages doubled their production of posts from roughly 37,000 in 2014 to an estimated 79,000 in 2017 (a 115% increase), though much of the uptick in volume of posts from multiplatform pages stems from just a few accounts.[3] The 15 Facebook-primary pages also increased their total number of posts from roughly 31,000 in

Science-related Facebook pages increased volume of posts in the past few years

Number of Facebook posts per year across each set of 15 pages
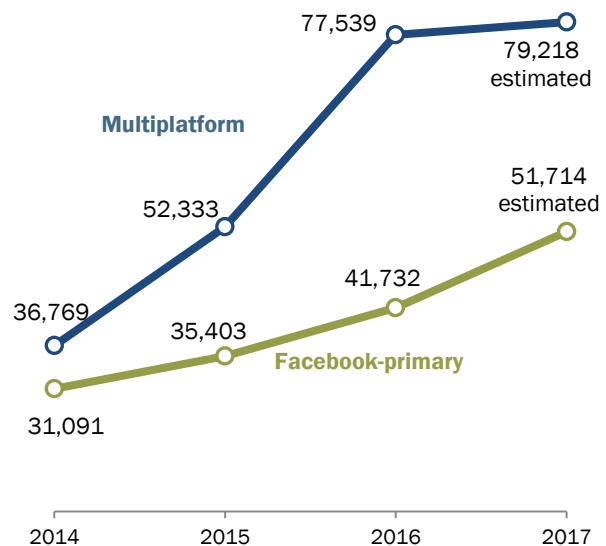
Note: Figures are the combined number of posts each year for the 15 Facebook-primary or 15 multiplatform pages. The number of posts for 2017 is estimated based on doubling the amount of posts that appeared in the first six months of the year because of missing data in Facebook's API. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of all Facebook posts from 30 science-related pages, January 2014 to June 2017. Data from the public Facebook Graph API.
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[3] The estimated number of posts for 2017 was calculated by doubling the number of posts during the first six months of that year. Facebook's public Graph API was missing large portions of data during the final six months of 2017, so precise totals were not available. In their forums in early 2018, Facebook acknowledged problems with the API that resulted in the absence of some posts. Analysis of 2014-2016 posts showed roughly even shares of posts in the first and second half of each calendar year.

2014 to an estimated 52,000 in 2017 (a 66% increase).[4]

The total volume and frequency of posts from each of these 30 accounts varies widely, however. The number of posts from 2017 is estimated from doubling the number posted during the first half of the year due to missing data in Facebook's API for the second half of the year.

The 2017 annual volume of posts across the 15 Facebook-primary pages ranged from about 24 posts by Stephen Hawking to more than 10,000 posts from [mindbodygreen](), a health and wellness media company. Four of these accounts – all of which are associated with prominent scientific figures – have more than 3 million followers but posted no more than about 200 times in 2017. Among the other pages, most increased the volume of posts over this time period. See [Appendix]() table for details.

The volume of posts on science-related Facebook pages varies, with more from multiplatform pages on average

Estimated number of posts in 2017 (based on doubling posts from first half of year)

Facebook-primary	Estimated number of posts 2017	Multiplatform	Estimated number of posts 2017
mindbodygreen	10,132	Women's Health	18,608
Health Digest	8,340	Health	13,444
Smart is the New Sexy (@enjoy.science)	8,310	New Scientist	10,630
David Wolfe	6,190	Popular Science	10,216
ScienceDump	5,456	Animal Planet	5,414
ScienceAlert	3,494	Science Channel	5,026
Interesting Engineering	3,460	National Geographic	3,884
IFLScience	2,394	NASA	2,686
Hashem Al-Ghaili (@ScienceNaturePage)	1,816	BBC Earth	2,196
Dr. Mehmet Oz	1,046	Psychology Today	1,592
Daily Health Tips	800	Discovery	1,560
Neil deGrasse Tyson	130	Science magazine	1,486
Bill Nye	84	Physics Today	1,078
Dr. Michio Kaku	38	NASA Earth	998
Stephen Hawking	24	MythBusters	400

Note: The number of posts for 2017 is estimated based on doubling the amount of posts that appeared in the first six months of the year because of missing data in Facebook's API. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of 30 science-related Facebook pages. Data from the public Facebook Graph API.
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[4] Two accounts began posting during this period: Hashem Al-Ghaili's Science Nature Page on July 29, 2015, and Smart is the New Sexy on April 29, 2016.

Some science-related accounts use Facebook differently than Twitter

The profile of these science-related accounts can vary across other social media platforms. To illustrate, Pew Research Center looked at Twitter activity from the same 30 organizations as of January 2018.

While far more adults in the U.S. use Facebook (68%) than Twitter (21%), according to a [2018 Pew Research Center survey](#), a handful of science-related pages in this study were comparatively more active on Twitter.

[Neil deGrasse Tyson](#) had about 11.4 million Twitter followers as of January 2018, roughly 2.5 times more than his 4 million Facebook followers. He was more active tweeting (493 times in 2017) than he was posting content on Facebook (about 130 times in 2017).

Similarly, Bill Nye was more active on [Twitter](#) than on Facebook (253 tweets in 2017, compared with about 84 posts).

Some science-related accounts are more active on Twitter than Facebook

Number of Twitter followers and tweets in 2017 for each page

Facebook-primary	Twitter Followers	Number of tweets	Multiplatform	Twitter Followers	Number of tweets
Neil deGrasse Tyson	11.4M	493	NASA	28.2M	5,067
Bill Nye	5.7M	253	National Geographic	21.9M	5,575
Dr. Mehmet Oz	4.3M	1,326	Discovery	8M	3,549
Daily Health Tips	2.8M	3,864	Women's Health	4.7M	15,886
Dr. Michio Kaku	637K	46	Health	3.6M	17,477
mindbodygreen	304K	9,589	New Scientist	3.4M	12,295
IFLScience	204K	1,503	Science Channel	2.9M	5,125
David Wolfe	95.7K	2,055	MythBusters	1.7M	767
Interesting Engineering	77.4K	5,194	Animal Planet	1.6M	2,491
ScienceAlert	67K	4,130	Popular Science	1.3M	20,683
ScienceDump	11.4K	3	NASA Earth	1.2M	1,484
Health Digest	3,985	336	Science magazine	1.1M	1,634
Hashem Al-Ghaili (@ScienceNature Page)	1,424	1	Psychology Today	547K	6,489
Smart is the New Sexy (@enjoy.science)	644	1,495	BBC Earth	434K	4,247
Stephen Hawking	NA	NA	Physics Today	125K	2,548

Note: Number of Twitter followers as of Jan. 31, 2018. Number of tweets from Jan. 1 to Dec. 31, 2017. Only the primary account was included for pages with multiple Twitter accounts. NA indicates not available; Stephen Hawking did not have a verified account on Twitter. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of Twitter data from Crimson Hexagon.
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Among the multiplatform pages, [NASA](#) and [Popular Science](#) were about twice as active tweeting than posting Facebook content in 2017. But while NASA had many more followers on Twitter than on Facebook (28.2 million vs.

19.4 million), Popular Science had a smaller user base on Twitter (1.3 million vs. 3.5 million on Facebook).

But several of these pages were less active on Twitter, particularly among the Facebook-primary pages. The list includes Health Digest, David Wolfe, ScienceDump, Hashem Al-Ghaili and Smart is the New Sexy, all of which have had a far less active presence on Twitter than Facebook and had orders of magnitude fewer followers on Twitter.[5] Stephen Hawking did not have an official Twitter account; Hashem Al-Ghaili and ScienceDump barely had a presence on Twitter, each with fewer than 5 posts in 2017.

All of the 15 multiplatform pages had a presence on Twitter. Only one in this set tweeted less than 1,000 times in 2017: MythBusters, a page that also posted on Facebook fewer than 500 times in 2017. Some multiplatform pages were less active on Twitter than they were on Facebook, including Animal Planet, BBC Earth and Physics Today.

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[5] Due to the differences in activity across social media platforms, the set of 30 popular science-related pages on Facebook omits some of the most popular Twitter accounts from science figures and organizations. For example, Dr. Sanjay Gupta's Twitter account had almost 2.6 million followers as of January 2018, while his Facebook page had only 87,000 page likes.

1. Most science-related Facebook pages specialize on a few science topics; some include posts far afield from science

At a time when science issues are increasingly part of the broader public discourse, Pew Research Center explored the role of science-related Facebook pages – both those that were meant to enhance the reach of existing science-related media enterprises and those that arose from science enthusiasts and experts utilizing social media platforms to bring their voice to science issues.

The analysis shows that users encounter a wide range of content on science-related Facebook pages. Few of the 30 pages in this analysis produce content across a range of STEM-related areas; in fact, just four of the 30 produce roughly similar shares of posts on several topics. Instead, most pages specialize. The bulk of their content touches just one or two science topics, such as health and medicine, food and nutrition, animal science, or astronomy and physics.

Further, each page tends to present content from one of a handful of frames, and for nearly two-thirds of the pages in this set, a majority of posts reflect just one frame: either new science-related discoveries, science news you can use, or promotions for programs or events.

A systematic analysis of posts produced by these 30 pages over the first half of 2017 found more variation among the pages than there was commonality. Most of these 30 pages appear to feature content they produce themselves, though a few of the Facebook-primary pages appear to serve primarily as aggregators with virtually no content originating from the source organization for the page.

Most science-related Facebook pages focus their content on one or two subject areas, especially health and food topics

Across this set of 30 pages, few aim to cover science across a range of scientific domains. Instead, most pages whether Facebook-primary or multiplatform ones specialize in one or two science topic areas. For example, 70% of posts from Interesting Engineering were related to engineering and technology topics. Similarly, 73% of posts from Psychology Today were related to the behavioral sciences, and nearly three-quarters of posts from NASA Earth (73%) were about energy and the environment.

Only four of the pages covered a roughly even share of posts on several topics, with no single topic making up more than one-in-five posts. These were IFLScience, ScienceAlert and ScienceDump, among the Facebook-primary pages, and New Scientist, among the multiplatform pages.

Health and medicine was the predominant topic in posts from many of these pages. About half or more of the posts from three of the Facebook-primary pages and two of the multiplatform pages were about health or medicine topics. For example, health/medicine topics were featured in 65% of posts from Daily Health Tips, 59% of Health Digest posts, and about half of the posts from Women's Health, Health, and Dr. Oz (a [cardiothoracic surgeon](#) known for his appearances on television).[6]

Example of a Facebook post with a health tip

Source: Screenshot of a post from the Health Digest Facebook page on Jan. 26, 2017. Retrieved on Feb. 26, 2018.
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Pages featuring a sizeable share of posts on health and medicine also tend to include posts on food, nutrition and the health effects of foods. Together, the share of posts on either health/medicine or food/nutrition account for the vast majority of posts from Daily Health Tips (92%), Health Digest (89%), Health and Dr. Oz (79% each). They also account for six-in-ten posts from Women's Health Magazine (60%).

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[6] Some have questioned health tips from Dr. Oz. See Philips, Amber. Sept. 15, 2016. "[That time Congress railed against Dr. Oz for his 'miracle' diet pills](#)." Washington Post.

Looking across all of these pages, 39% of posts from Facebook-primary pages and 15% of posts from multiplatform posts related to health and food topics. Among this group, many featured posts on personal health, nutrition, weight loss, exercise and beauty tips, such as a post suggesting that consuming garlic will help lower blood sugar and cholesterol levels (as seen in a June 16, 2017, Daily Health Tips post) and another extolling the virtues of egg and olive oil for healthy hair (also seen in another post from Daily Health Tips on June 16, 2017).

Animal science was the leading topic on three of the multiplatform pages. Posts about animals made up at least half of the content from Animal Planet (75%), BBC Earth (56%) and National Geographic (50%). None of the 15 Facebook-primary pages featured a large share

Example of a health-related Facebook post with a beauty tip

Source: Screenshot of a post from the Daily Health Tips Facebook page on June 16, 2017. Retrieved on Oct. 19, 2017.
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of posts about animals; the largest in this set was IFLScience with 18% of its posts related to animal science.

Three of the Facebook-primary pages belong to prominent astrophysicists. Not surprisingly, about half or more of the posts on these pages were related to astronomy or physics: Dr. Michio Kaku (58%), Stephen Hawking (58%) and Neil deGrasse Tyson (48%).

Bill Nye, another prominent figure known primarily as a science educator, tended to post more generic content; 67% of the posts from his page were categorized as general and not connected with a specific science topic. Many of these posts offered previews of his book and his Netflix television program. (For more on promotional posts, see the discussion below on the primary "frame" of posts on these pages.)

Some pages included a sizeable share of posts that were far afield from science topics. For example, about a third of the posts on Smart is the New Sexy (32%) and almost three-in-ten posts on David Wolfe's page (28%) were not about science topics. Many of these posts featured inspirational quotes, holiday greetings, news about popular culture or demonstrations showing how to make crafts.

Facebook-primary pages: Most pages concentrate on just a few science topics

% of each Facebook page's posts that are about each topic

FOR EACH PAGE, TOPIC WITH: ⬛ Greatest percentage of posts ⬜ Second greatest percentage of posts

PAGE:	TOPIC: Health/ medicine	Food/ nutrition	Engi-neering/ tech	Behavioral sciences	Energy/ environ-ment	Animal science	Astron-omy/ physics	Other specific topics	General	Non-science
Daily Health Tips	65%	27%		2%				4%	<1%	3%
Health Digest	59	30	1	<1	<1			6	1	3
Dr. Mehmet Oz	48	31	1	3				6	6	5
mindbodygreen	27	22		15	1			24	6	5
David Wolfe	26	10	6	12	4	4	1	8	2	28
Hashem Al-Ghaili (@ScienceNaturePage)	26	1	24	1	13	9	10	11	4	1
ScienceAlert	17	<1	14	1	8	8	27	18	5	<1
ScienceDump	16	5	14	6	9	8	9	22	6	6
Smart is the New Sexy (@enjoy.science)	14	6	12	5	1	3	2	12	13	32
IFLScience	11	2	5	4	17	18	19	18	4	1
Interesting Engineering	3	1	70	1	6	<1	12	1	3	2
Bill Nye	2		3	2	14		5	5	67	2
Neil deGrasse Tyson		2	2	2	2		48		37	9
Stephen Hawking			8				58		25	8
Dr. Michio Kaku							58	5	32	5

Note: Figures in each row may not add to 100% due to rounding. Figures for "other specific topics" combines posts on neurology, archaeology, geology, math, chemistry, spirituality, paranormal, travel, and posts on feats and phenomena; see the Appendix for the share of posts on each. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet.

Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.

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Multiplatform pages: Most pages concentrate on just a few science topics

% of each Facebook page's posts that are about each topic

FOR EACH PAGE, TOPIC WITH: ▉ Greatest percentage of posts ▢ Second greatest percentage of posts

PAGE:	TOPIC: Health/ medicine	Food/ nutrition	Engi- neering/ tech	Behavioral sciences	Energy/ environ- ment	Animal science	Astron- omy/ physics	Other specific topics	General	Non- science
Women's Health	48%	12%	1%	24%				3%	<1%	12%
Health	47	29	<1	3			<1	6	1	13
Science magazine	24	2	7	4	7	16	8	12	20	
New Scientist	16	1	14	2	8	18	19	14	7	
Popular Science	12	4	34	1	8	10	18	7	5	1
Animal Planet	8	<1	2		<1	75		6	8	<1
BBC Earth	4		1	<1	13	56	5	16	4	
National Geographic	3	<1	1	2	14	50	4	19	4	1
Psychology Today	2		1	73		2		21	<1	<1
MythBusters	2	3	19	1	4	5	24	4	34	5
Science Channel	1	2	23		8	6	37	9	11	2
Discovery	1	<1	6		7	28	7	7	43	
NASA	1	<1	3		10	1	80	1	4	1
Physics Today	1		4	<1	7	3	64	8	13	<1
NASA Earth	<1		2		73	<1	12	10	2	1

Note: Figures in each row may not add to 100% due to rounding. Figures for "other specific topics" combines posts on neurology, archaeology, geology, math, chemistry, spirituality, paranormal, travel, and posts on feats and phenomena; see the Appendix for the share of posts on each. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research analysis of a random sample of Facebook posts from 30 science-related Facebook pages, January to June 2017. Data from the public Facebook Graph API.
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Science-related stories at the center of public divisions did not appear often on these Facebook pages

Coverage of major scientific controversies in public discourse was rare on these Facebook pages. For example, while an average of 8% of posts across the 30 pages were about energy and environmental issues, broadly speaking, a much smaller share of these posts were related to climate change – only 1% of posts on Facebook-primary pages and 2% on multiplatform pages.[7]

Similarly, only about 1% of posts mentioned genetically modified foods or crops.

The April 22, 2017, March for Science, which included a large demonstration in Washington, D.C. and hundreds of satellite protests, marches and demonstrations around the world, received hardly any attention on these pages, accounting for less than 1% of all posts. There were just five posts in the entire sample of 30 Facebook pages that mentioned the March for Science during the month of April in 2017; three of these were from Bill Nye, an honorary co-chair for the event.

Major stories receive little attention on both types of Facebook pages

% of Facebook posts on each topic and storyline: January to June 2017

	Facebook primary	Multiplatform
Energy/environment	5%	11%
That mention climate change	1	2
That mention major weather events	<1	3
That do NOT mention either	3	6
Food and nutrition	12	4
That mention GMOs	1	<1
That do NOT mention GMOs	11	4
Health and medicine	27	12
That mention vaccines	1	<1
That do NOT mention vaccines	26	11
General science	6	10
That mention March for Science, April 22, 2017	<1	<1
That do NOT mention March for Science	6	10

Note: Figures based on primary topic and storyline of post. "GMOs" stand for genetically modified organisms. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.
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[7] There were a small number of posts related to other topics that mentioned climate change, major weather events, genetically modified organisms (GMOs) or vaccines.

Multiplatform pages rely heavily on their own content sources; a few Facebook-primary pages serve as aggregators, mostly sharing content published by other organizations

An ongoing question about news shared on social media platforms concerns the extent to which the accounts are featuring information they produce themselves or whether they amplify information produced by other organizations, perhaps with the assistance of automated news generators.

One way to gauge the extent to which these pages are generating custom content for their pages is to classify the source of each post as stemming from the account holder or from an outside organization.[8]

Multiplatform pages tend to have staff and other resources that might make it easier to create custom-generated content on their pages. The majority of posts from the 15 multiplatform pages came from content produced by the page owner's organization. Indeed, 100% of the posts on the National Geographic and Science Magazine Facebook pages were produced by their

Most of these science-related Facebook pages feature content they produce; a few aggregate information from other sources

% of Facebook posts produced by the page's organization: January to June 2017

Facebook-primary		Multiplatform	
mindbodygreen	100%	National Geographic	100%
Interesting Engineering	95	Science magazine	100
IFLScience	93	Discovery	99
Dr. Mehmet Oz	90	Animal Planet	99
David Wolfe	81	NASA	98
ScienceAlert	81	New Scientist	98
Bill Nye	76	Psychology Today	98
Stephen Hawking	58	NASA Earth	97
Neil deGrasse Tyson	54	BBC Earth	96
Dr. Michio Kaku	53	Popular Science	93
Hashem Al-Ghaili (@ScienceNaturePage)	52	Women's Health	86
Smart is the New Sexy (@enjoy.science)	22	Health	80
ScienceDump	0	Science Channel	80
Daily Health Tips	NA	MythBusters	78
Health Digest	NA	Physics Today	63

Note: NA indicates not available because the ownership of the websites is unclear. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.

Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API. "The Science People See on Social Media"

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[8] This analysis looked at the source organization of the URL for the post and, where available, the author of the post.

own organizations. The vast majority of posts from a number of other science-related pages for multiplatform organizations also followed this strategy.

There was more variation among the set of Facebook-primary pages. While a page such as IFLScience started with just one person in 2012, it has grown in staff and resources. Some 93% of the posts from IFLScience during the time studied came from content produced by that organization, as did 95% of the posts from Interesting Engineering and 100% of the posts from mindbodygreen.

ScienceDump and a few of the other Facebook-primary pages, on the other hand, appear to serve primarily as web aggregators, linking to content originally produced by others. Daily Health Tips appears to serve almost exclusively as an aggregator, producing virtually no original content.[9]

Most science Facebook pages have a single frame for their stories

Pew Research Center coded the primary "frame" (or main goal or focus of the post) of a random

sample of posts from each page appearing in the first half of 2017. The bulk of posts across the 30 Facebook pages utilized one of three frames: news about a scientific discovery or development, science-related "news you can use," or a promotion for a media program on another platform.

Scientific discoveries

Overall, 29% of the posts across these 30 pages featured a new scientific discovery or development. The bulk of posts from ScienceAlert (72%), NASA Earth (71%), New Scientist (69%) IFLScience (68%) and Science magazine (61%) were aimed, primarily, at sharing news about a recent science discovery or development. Examples include a March 20, 2017, post from NASA showing years of satellite images demonstrating that New Zealand's

Example of a Facebook post about a new scientific discovery
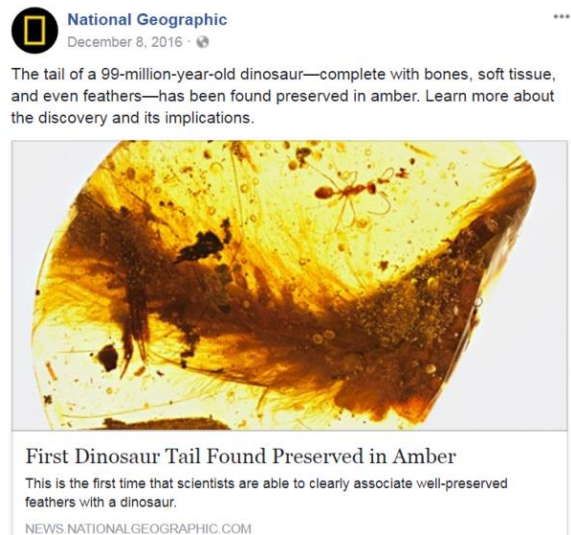
Source: Screenshot of a post on National Geographic's Facebook page from Dec. 8, 2016. Retrieved on Jan. 25, 2018.
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[9] The ownership of Health Digest and Daily Health Tips is unclear. Many of their posts link to websites that are similar in appearance and may be owned by the same company. Pew Research Center found 42% of the posts from Health Digest link to websites with the same name as the Facebook page and less than 1% of the posts from Daily Health Tips did so.

glaciers are retreating; a post from Science magazine on March 7, 2017, about new developments in the study of neural networks; and a May 5, 2017, post from New Scientist about researchers who recreated a gene from billions of years ago that help explains how early life coped with oxygen-poor air.

Across the 30 Facebook pages, a majority of these posts focused on energy and environment, geology, and archeology, and about half of posts on astronomy or physics had a new discovery frame.

'News you can use'

The next most common type of post – comprising 21% of posts across these 30 pages in this sample – showed science "news you can use," much of which was advice-oriented and self-hip tips. A majority of posts from three Facebook-primary accounts with a large share of posts on health/medicine and food/nutrition had a "news you can use" frame: Daily Health Tips (96%); Health Digest (85%); mindbodygreen (69%). And two of the multiplatform pages used a "news you can use" frame in the majority of their posts: Psychology Today (67%) and Health (56%). Across the 30 pages, 67% of posts related to food and nutrition used a "news you can use" frame, as did 56% of posts on behavioral science and 48% of posts focused on health and medicine.

Example of a 'news you can use' Facebook post about food and nutrition

Source: Screenshot of a post on Health's Facebook page from Jan. 9, 2016. Retrieved on Jan. 25, 2018.
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Promotional posts

Across the set of 30 pages, 16% of posts were promotional in nature. Several accounts aimed a majority of their posts at promoting other media and public appearances. The four prominent scientists among the Facebook-primary pages posted fewer than 200 times over the course of 2017, but when they did, a majority of their posts were promotions (79% of posts from Dr. Michio Kaku, 78% of posts from Neil deGrasse Tyson, 64% of posts from Bill Nye and 58% of posts from Stephen Hawking). Most of these were self-promotional posts related to television appearances, book signings or speeches.

About half or more of the posts from three multiplatform pages were focused on promotions: Animal Planet (79%), Discovery (65%) and MythBusters (54%). Promotional posts on Discovery were mostly promoting shows from Discovery Communication Inc.; promotional posts on the MythBusters page generally promoted episodes from the show, another of the Discovery Communications Inc. productions.

Beyond these three frames, other focus points for the Facebook posts were less common. Across the 30 pages, some 12% of posts focused on explanations of a scientific concept or idea. A handful of pages (such as Hashem Al-Ghaili's Science Nature Page, Interesting Engineering, National Geographic and Science Channel) included a sizeable share – around a fifth to a quarter – of posts that focused on explanations of a scientific concept or idea. Examples of these include a post on Interesting Engineering about the design of a suspension bridge in Bristol, England, and a video posted on Science Channel's page demonstrating the size of the world's largest radio telescope located in China.

No other frame accounted for more than 10% of Facebook posts across the 30 pages. A few pages

Example of a Facebook video promotion for a TV show

Source: Screenshot of a post on Discovery's Facebook page from June 27, 2017. Retrieved on Oct.18, 2017.
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included archived or previously published material in about 20% to 30% of their posts (e.g., Women's Health, Popular Science, Smart is the New Sexy, and David Wolfe). And one page, Physics Today, included about three-in-ten posts that profiled notable scientists.[10] See Appendix for details.

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[10] The primary frame of each post was classified without regard to the science topic of the post; the exception is that posts classified as not related to a science topic were classified as having a non-science frame.

Common frames for posts on science-related Facebook-primary pages

% of each Facebook pages' posts that are ...

	New discoveries	'News you can use'	Promotions/ads	Explanations of concepts
ScienceAlert	72%	4%	4%	10%
IFLScience	68	5	4	6
Hashem Al-Ghaili	50	2	5	30
ScienceDump	47	5	1	20
Interesting Engineering	35	7	12	27
David Wolfe	12	37	5	8
mindbodygreen	6	69	2	1
Bill Nye	5		64	17
Smart is the New Sexy	4	29	5	14
Dr. Mehmet Oz	4	26	39	6
Health Digest	1	85		2
Neil deGrasse Tyson			78	
Stephen Hawking			58	
Daily Health Tips		96		1
Dr. Michio Kaku			79	5
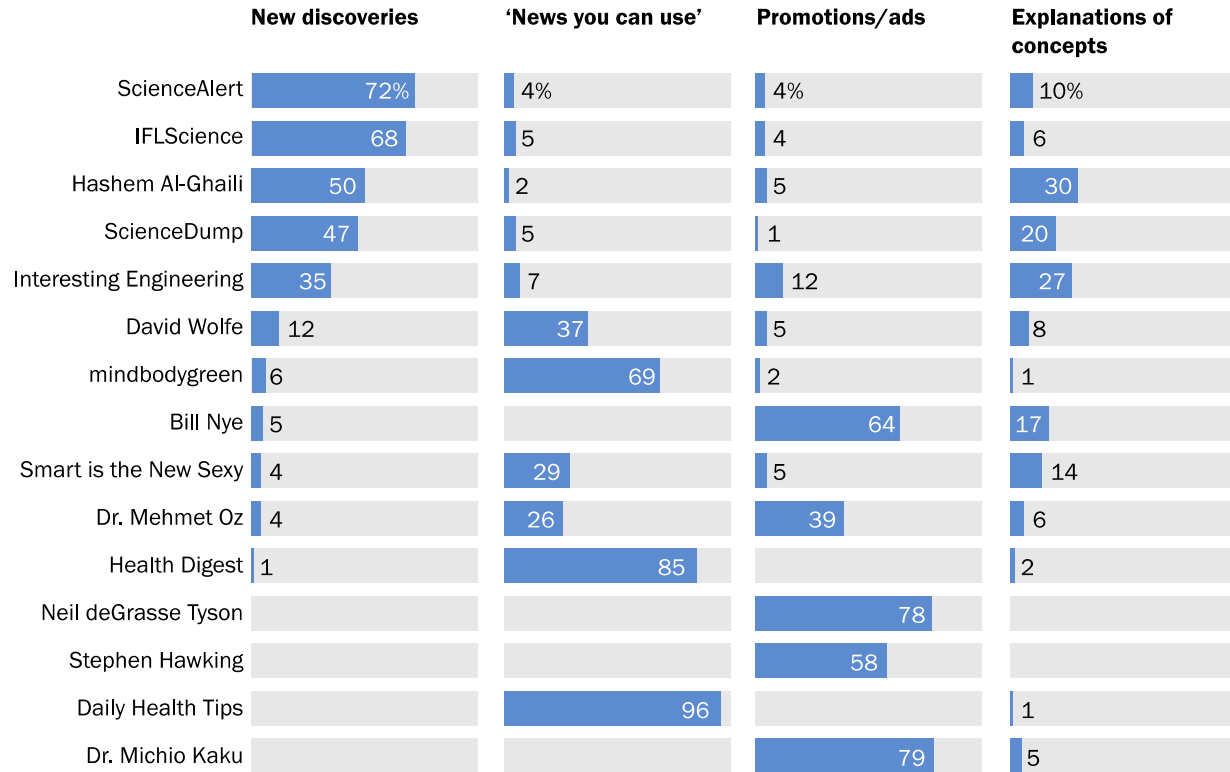
Note: Figures for each Facebook page do not add to 100% because the share of posts using other frames are not shown. See Appendix for details. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet.
Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.
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Common frames for posts on science-related multiplatform pages

% of each Facebook pages' posts that are …

	New discoveries	'News you can use'	Promotions/ads	Explanations of concepts
NASA Earth	71%	0%	5%	10%
New Scientist	69	3	5	8
Science magazine	61	3	12	4
NASA	54	2	20	12
Physics Today	40	1	2	15
National Geographic	39		11	26
Popular Science	37	14	2	13
BBC Earth	27	1	16	23
Science Channel	24	1	40	26
Health	12	56	2	4
Psychology Today	10	67		9
Women's Health	8	40	2	7
MythBusters	6	1	54	21
Discovery	5	2	65	10
Animal Planet	5	6	79	3

Note: Figures for each Facebook page do not add to 100% because the of posts using other frames are not shown. See Appendix for details.
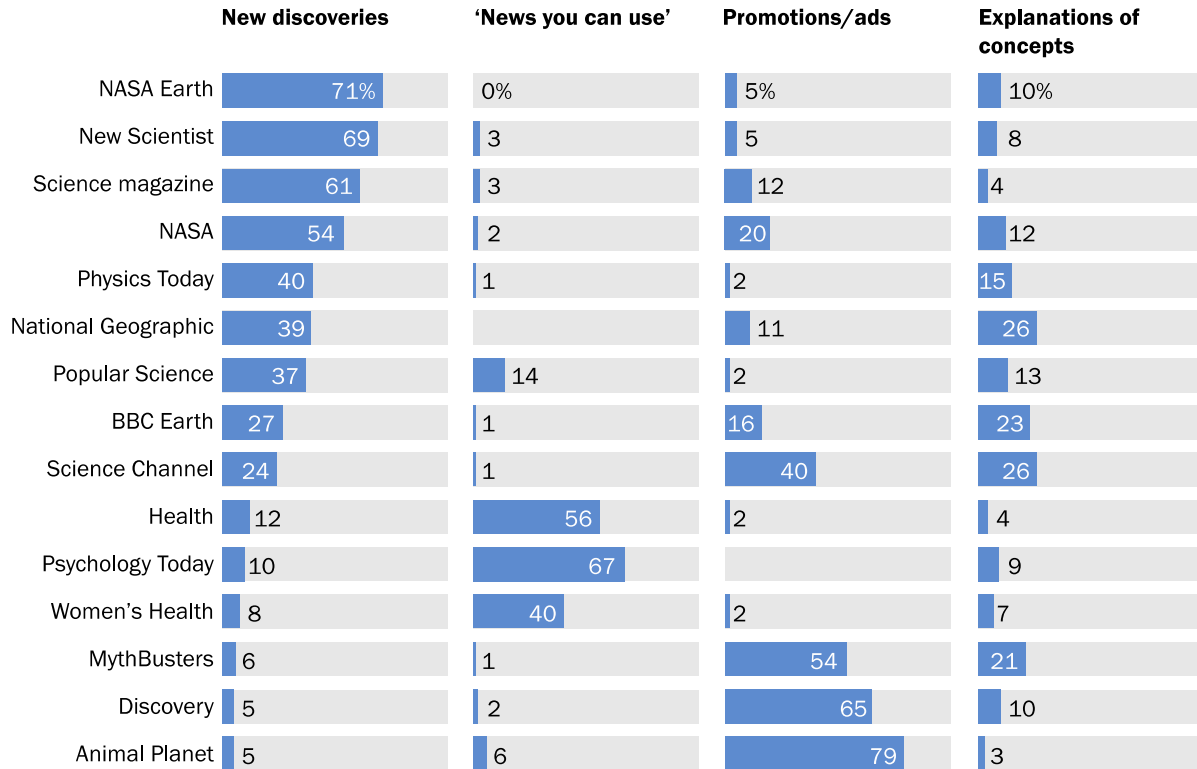Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
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Multiplatform pages link to external research sources slightly more often than Facebook-primary pages

To gauge the extent to which these Facebook pages spread information about scientific research, Pew Research Center analysis classified the share of posts that included a link to research evidence from an outside organization.

In total, the study found that nearly one-quarter of posts on these 30 pages (23%) linked to external scientific research.[11] Such links were often to peer-reviewed publications, but some were original research from government agencies or other institutions.[12] On average, links to external scientific research were more common among multiplatform pages (25%) than among Facebook-primary pages (21%).

The share of posts with links to outside research varies widely depending on the frame of the post. Among the small number of posts related to conflict or disagreement about scientific findings appearing on any of these 30 pages, 64% had an external link.

Of posts across these 30 pages using a new scientific discovery frame, 47% included a link or reference to outside evidence (50% among Facebook-primary and 44% among multiplatform pages). A majority of posts from ScienceAlert, for example, featured a new scientific discovery or development, and the vast majority of those posts included a link to outside evidence.

The share of posts linking to research from other organizations varies widely

% of Facebook posts using each frame with links to external research sources: January to June 2017

	Facebook-primary	Multiplatform
New discoveries	50%	44%
Explanations of concepts	14	25
'News you can use'	13	22
Promotions/ads	1	1
Calls to action	0	4
Visuals (with little or no text)	0	1
Profiles of scientists	7	10
Conflicting findings	71	57
Research misconduct/bias	33	46
Media coverage of science	0	12
Research funding	18	32
Education issues	17	67
Travel	11	6
Reposts from page archives	27	35
Topic is not science-related	0	0

Note: Links to external sources includes hyperlinks or full bibliographical information to original research conducted by a different organization than the one who posted it. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.
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[11] This only includes links in the text of posts. Some pages, particularly Hashem Al-Ghaili's Science Nature Page, occasionally place links to a scientific publication in their comments, which were not coded in this study.

[12] Posts were only counted as having an external link to original research if the content included work by a different organization. Some organizations produce their own original research (e.g., NASA, NASA Earth, National Geographic) and therefore rarely link to other websites in order to report original findings.

A minority of posts using a "news you can use," promotion, or explanation frame included links to external evidence.
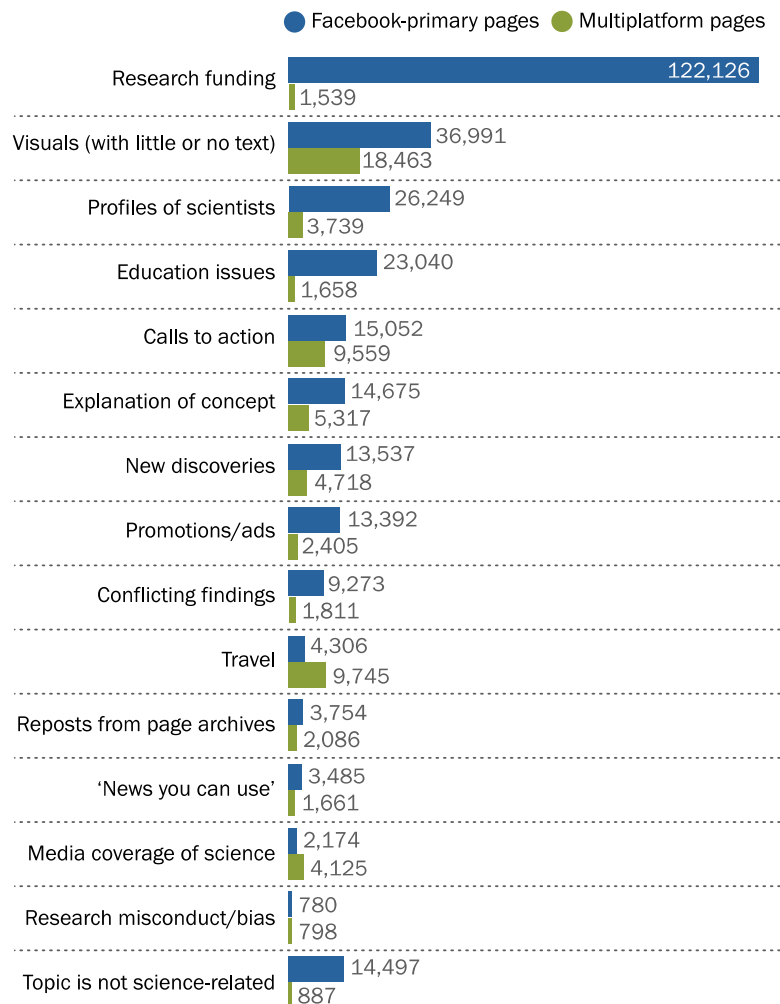
2. User engagement with posts on science-related Facebook pages is more common for visual posts, calls to action

While the most common frames for posts on the 30 science-related Facebook pages in this analysis feature new discoveries or science "news you can use," posts with more engagement – a term used to characterize the number of user interactions with a post from shares, comments, and likes or other reactions – tend to use other frames. Posts from the first half of 2017 with the highest average number of interactions per post used frames related to science research funding and pictures or other visual display with little or no text.

Posts related to science funding were typically tied to discussion of President Donald Trump's first proposed budget in early 2017 and the potential changes for science funding.

Facebook posts about science research funding garnered high user engagement, followed by posts with visuals

Average number of interactions per Facebook post using each frame: January to June 2017

● Facebook-primary pages ● Multiplatform pages

Frame	Facebook-primary	Multiplatform
Research funding	122,126	1,539
Visuals (with little or no text)	36,991	18,463
Profiles of scientists	26,249	3,739
Education issues	23,040	1,658
Calls to action	15,052	9,559
Explanation of concept	14,675	5,317
New discoveries	13,537	4,718
Promotions/ads	13,392	2,405
Conflicting findings	9,273	1,811
Travel	4,306	9,745
Reposts from page archives	3,754	2,086
'News you can use'	3,485	1,661
Media coverage of science	2,174	4,125
Research misconduct/bias	780	798
Topic is not science-related	14,497	887

Note: Figures are the average number of interactions per post for the 15 Facebook-primary or the 15 multiplatform pages. Average number of interactions per post includes the number of shares, comments, and likes or other reactions. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.
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Those were topics of unique prominence during the study period, January to June 2017. Only 1% of posts in the sample from these 30 pages used a frame centered on science research funding. Audience interaction with such posts was high, however, particularly on Facebook-primary pages.

Posts on the 15 Facebook-primary pages with a research-funding frame averaged 122,126 interactions each, more than three times the next highest category. By contrast, posts using a

Posts about news you can use and new discoveries are common, yet other types of frames average more interactions

Average number of interactions per Facebook post using each frame: January to June 2017

	Facebook-primary pages		Multiplatform pages	
	% of posts covering these topics	Average number of interactions per post	% of posts covering these topics	Average number of interactions per post
'News you can use'	32%	3,485	13%	1,661
New discoveries	26	13,537	32	4,718
Explanations of concepts	11	14,675	13	5,317
Promotions/ads	10	13,392	21	2,405
Reposts from page archives	6	3,754	8	2,086
Visuals (with little or no text)	3	36,991	2	18,463
Calls to action	2	15,052	2	9,559
Profiles of scientists	1	26,249	3	3,739
Research funding	1	122,126	1	1,539
Travel	1	4,306	1	9,745
Conflicting findings	<1	9,273	<1	1,811
Education issues	<1	23,040	<1	1,658
Research misconduct/bias	<1	780	<1	798
Media coverage of science	<1	2,174	<1	4,125
Topic is not science-related	8	14,497	2	887

Note: Average number of interactions per post includes the number of shares, comments, and likes or other reactions. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.
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research-funding frame on the 15 multiplatform pages averaged just 1,539 interactions per post.

Many of these highly engaging posts linked to stories suggesting Trump was considering a decrease in science-agency funding. For example, a Jan. 25, 2017, IFLScience post called Trump's Freeze On EPA Grants Leaves Scientists Wondering What It Means was shared more than 22,000 times on Facebook and had 62,000 likes and other reactions.

Beyond posts with a research funding frame, those consisting solely of a visual display (using little or no text) and those with a call to action were also highly engaging. Visual posts could cover a range of topics; some used videos with almost no text while others were picture-based. Call to action posts include those that explicitly requested that users engage with the post, such as asking users to provide a caption for a photo or share the post with others.

Both types of posts are relatively uncommon, each consisting of only 2% to 3% of posts across the 30 science-related pages. Here, too, however, posts with these frames from the Facebook-primary pages averaged more interactions than those with the same frame from the multiplatform pages. On Facebook-primary pages, visual posts averaged nearly 37,000 interactions each. On multiplatform pages, these types of posts averaged about half as many interactions, roughly 18,500 interactions each.

Overall, posts from the 15 Facebook-primary pages averaged a higher number of interactions than posts using the same frame among the 15 multiplatform pages. Two exceptions were posts using a travel frame and those related to media coverage of science. For these frames, audience engagement was higher, on average, for posts from the multiplatform pages. Travel posts were more common on the National Geographic and Discovery pages; many of these posts included photographs of scenic destinations such as Vancouver and the cliffs of Ireland.[13]

The reasons behind the generally higher interactions with posts on the Facebook-primary as compared with the multiplatform pages are not clear. There may be systematic differences in the way these pages use each frame, which impacts audience engagement. Exploration of such differences goes beyond the aspects examined in the current study.

Facebook pages with more followers likely yield more interactions in large part because more users generally see posts from those pages in their news feeds. However, users who do not follow a given page may also encounter the same content. Any time a user interacts with a post, that post *may* appear in the news feed of their friends, even of those who do not follow the page.

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[13] In the case of posts related to misconduct and biases in research findings, there was virtually no difference in user engagement between the two sets of pages.

Facebook uses proprietary algorithms to determine which posts show up in a user's news feed. Facebook has made numerous changes to its algorithms over the years, and these changes affect the level of engagement posts receive. It is hard to evaluate the impact of changes in the algorithms because Facebook does not disclose the full details of the proprietary algorithms that drive the content users see. This study was conducted in 2017, prior to a major 2018 announcement by Facebook's CEO Mark Zuckerberg of further changes to its algorithms, giving more weight to content from friends and family over that of news organizations and other content providers that are not individuals.

Other framing categories

Posts categorized as topically unrelated to a scientific domain were listed in this study as using a non-science frame. As with most other types of frames, non-science posts across the set of 15 Facebook-primary pages averaged higher levels of audience engagement than did those using the same frame from multiplatform pages. For Facebook-primary pages, these posts received an average of about 14,500 interactions each – putting the category in the middle-of-the-pack compared with other frames. For multiplatform pages, however, non-science posts averaged less than 900 interactions each, lower than for any other frame used. These types of posts made up 8% of posts on Facebook-primary pages, compared with just 2% of multiplatform pages. One example of a highly engaging post of this sort featured an inspirational quote; this post from David Wolfe's page on Nov. 27, 2015, was shared more than 1.3 million times and received more than 29,000 comments. As shown in a nearby table, this post was one of the top 15 most-engaging posts across any of the 15 Facebook-primary pages between January 2014 and June 2017.

Example of a non-science Facebook post with an inspirational quote

Source: Screenshot of a post on David Wolfe's Facebook page from Nov. 27, 2015. Retrieved on Oct. 30, 2017.
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As discussed in Chapter 1, these 30 Facebook pages tend to focus on just one or two scientific topics or domains. The average interaction with posts was not strongly correlated with the topic area of the post. See Appendix for details.

The most popular individual posts on these science-related pages used a variety of frames, and many included video and were produced by just a few Facebook accounts

A close examination of the top 15 most engaging individual posts from this set of 30 science-related Facebook pages in the last few years (Jan. 1, 2014 to June 30, 2017) finds that these posts represent a variety of science topics and frames. While the average interactions for posts using a visual-only frame and call-to-action frame tend to be higher than posts with other frames, there are posts in the top 15 with the most engagement from a wide range of frame types, including posts that explain scientific concepts, highlight new discoveries and feature ways people can put science information to use in their lives.

Video is a common feature among many of these Facebook posts with the highest levels of user engagement. Among posts appearing on the multiplatform pages between January 2014 and the end of June 2017, 12 of the top 15 most-engaging posts included video. Six of top 15 posts appearing on the Facebook-primary pages during this period also included video, while another 6 from this set of pages included a prominent picture.

National Geographic produced the greatest share of the top 15 most-engaging posts among the multiplatform pages (11 of the 15). Most of these included videos of animals such as a Sept. 8, 2016, video of Alpine goats climbing a mountain.

The single post with the highest number of interactions for multiplatform pages during this time period was picture of the Eiffel Tower posted on Nov. 14, 2015, in response to terror attacks in Paris. This post from National Geographic on a non-science topic included the hashtag #lovetoParis and had more than 1.1 million likes and other reactions, 182,000 shares and 9,600 comments.

A highly engaging Facebook post on a science-related multiplatform page

National Geographic
November 13, 2015

Today we are all French. #lovetoParis

1.1M Likes   9.5K Comments   181K Shares

Note: "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Screenshot from the post with the highest number of interactions from the 15 science-related multiplatform pages, January 2014 to June 2017. Posted on National Geographic's Facebook page on Nov. 14, 2015. Retrieved on Oct. 30, 2017. Data collected from the public Facebook Graph API.
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Among the science-related Facebook-primary pages, 12 of the top 15 most engaging posts were produced by David Wolfe, an author and product spokesman who emphasizes alternative remedies and promotes the health benefits of raw foods.[14] Half of these 12 popular posts from David Wolfe featured inspirational sayings or advice, such as an April 2015 post which encouraged readers to "look after your friends."

The single post with the most interactions (5.4 million in total) was a call for participation. The post – produced by David Wolfe on Oct. 10, 2015 – featured a picture of fruit cups and a request that users should "share this if you think they should have this in school."

A highly engaging post on a science-related Facebook-primary page

Note: "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet.
Source: Screenshot from the post with the highest number of interactions from the 15 science-related Facebook-primary pages, January 2014 to June 2017. Posted on David Wolfe's Facebook page on Oct. 10, 2015. Retrieved on Oct. 30, 2017. Data collected from the public Facebook Graph API.
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[14] See Senapathy, Kavin. Jan. 1, 2016. "A New Year's Resolution For Science Advocates: Don't Cry Wolfe" Forbes.

Top 15 posts by user engagement among science-related Facebook-primary pages

Facebook posts with the highest number of interactions, January 2014 to June 2017

	Page	Number of interactions	Date of post	Title and description of post	Primary topic	Primary frame
1	David Wolfe	5,432,916	Oct. 10, 2015	"Share this if you think they should have this in school." (picture of fruit cups)	Food/ nutrition	Call to action
2	Hashem Al-Ghaili (@ScienceNature Page)	4,207,149	Jan. 13, 2016	"This interesting concept could save thousands of lives from plane crashes." (Video about planes with detachable cabins)	Engineering/ tech	Explanation of concept
3	David Wolfe	4,151,585	June 5, 2015	"Drinking Water at the Correct Time Maximizes its Effectiveness on the Human Body" (picture)	Food/ nutrition	'News you can use'
4	David Wolfe	3,728,525	April 13, 2015	"Look after your friends. Make sure they're okay. Sometimes they are going through things that are really heavy, but they might not say it." (picture)	Behavioral science	'News you can use'
5	David Wolfe	3,607,372	April 8, 2015	"A Note from a Mother" (poem)	Non-science	Non-science
6	Hashem Al-Ghaili (@ScienceNature Page)	3,087,114	Jan. 30, 2016	"This device can bring dead hearts back to life." (video about medical device)	Health/ medicine	New discovery
7	David Wolfe	3,040,094	Nov. 9, 2015	"Believe in yourself" (picture of cat looking in reflection)	Non-science	Non-science
8	David Wolfe	3,028,215	June 7, 2016	"Camp With the Comfort of a Hammock And The Security Of A Tent" (video about camping equipment)	Engineering/ tech	Explanation of concept
9	David Wolfe	3,013,765	Jan. 26, 2016	"Sometimes the grass is greener on the other side because it's fake" (picture)	Non-science	Non-science
10	David Wolfe	2,998,982	July 23, 2015	Quote from Robin Williams about mental health	Neurology	Explanation of concept
11	David Wolfe	2,818,155	March 27, 2015	Video of dancing girl on TV talent show	Feats/ phenomena	Visual only
12	Hashem Al-Ghaili (@ScienceNature Page)	2,646,077	May 8, 2016	Video about baby in womb and bond with mother	Health/ medicine	Explanation of concept
13	David Wolfe	2,621,409	Sept. 16, 2015	"Spend time with your parents, treat them well. Because one day, when you look up from your phone, they won't be there anymore." (picture)	Behavioral science	'News you can use'
14	David Wolfe	2,568,205	Nov. 20, 2016	"Top 10 Acupressure Points to Relieve Body Pains & Aches" (video)	Health/ medicine	'News you can use'
15	David Wolfe	2,278,143	Nov. 27, 2015	"Some people want a big house, a fast car, and lots of money. Others just want a tiny cabin in the woods away from those kinds of people." (picture)	Non-science	Non-science

Note: Number of interactions as of June 2017. Interactions include the number of shares, comments, and likes or other reactions. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet.

Source: Pew Research Center analysis of all Facebook posts from 30 science-related pages, January 2014 to June 2017. Data collected from the public Facebook Graph API.

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Top 15 posts by user engagement among science-related multiplatform accounts

Facebook posts with the highest number of interactions, January 2014 to June 2017

	Page	Number of interactions	Date of post	Title and description of post	Primary topic	Primary frame
1	National Geographic	1,359,732	Nov. 14, 2015	"Today we are all French. #lovetoParis" (response to Paris terrorist attacks)	Non-science	Non-science
2	BBC Earth	1,161,401	Oct. 14, 2016	Video preview of Planet Earth II TV series	Animal science	Promotion/ad
3	BBC Earth	1,034,452	Sept. 28, 2015	Video of volcanic ash cloud sparked by lightning	Energy/ environment	Visual
4	National Geographic	639,201	Aug. 5, 2016	360 degree video of interaction with hammerhead shark	Animal science	Visual
5	National Geographic	627,604	Sept. 8, 2016	Video of Alpine goats climbing mountains	Animal science	Explanation of concept
6	National Geographic	589,512	June 20, 2016	"Scientists are concerned that the release of #FindingDory will lead to a demand for blue tangs as pets. Here's why that's a huge problem." (video)	Animal science	Explanation of concept
7	National Geographic	534,015	May 13, 2017	Video of well-preserved dinosaur fossil found in Canada	Archeology	New discovery
8	National Geographic	510,280	Feb. 20, 2016	Video of panda playing in snow at Toronto Zoo	Animal science	Explanation of concept
9	National Geographic	424,362	Nov. 23, 2015	Video of gathering of snakes in Canada	Animal science	Explanation of concept
10	NASA	404,693	Nov. 19, 2016	Live video of the launch of a weather satellite	Astronomy/ physics	New discovery
11	National Geographic	396,514	Dec. 8, 2016	Discovery of a dinosaur tail preserved in amber (article)	Archeology	New discovery
12	National Geographic	374,167	May 26, 2014	"Help us caption this photo" contest with picture of monkeys	Animal science	Call to action
13	Health	372,773	March 11, 2016	Recipe for making oven roasted sweet potato chips (video)	Food/ nutrition	'News you can use'
14	National Geographic	363,226	March 2, 2016	360 degree video of Klyuchevskoy, one of the tallest and most active volcanoes on the planet	Energy/ environment	Visual
15	National Geographic	355,856	March 6, 2016	360 degree video of a group of swimming brown bears	Animal science	Visual

Note: Number of interactions as of June 2017. Interactions include the number of shares, comments, and likes or other reactions. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of all Facebook posts from 30 science-related pages, January 2014 to June 2017. Data collected from the public Facebook Graph API.
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Methodology

Data in this study came from two main data sources: 1) analysis of Facebook posts from a set of 30 science-related pages based on data downloaded from the public Facebook Graph API from Jan. 1, 2014 to June 30, 2017, and 2) human content analysis coding by Pew Research Center staff of a random selection of Facebook posts produced by each of these pages from Jan. 1 to June 30, 2017.

Selection of science-related Facebook pages

For a comparison of Facebook pages from Facebook-primary and multiplatform organizations, the Center identified science-related public pages (in English only) with a large number of followers. The term "follower" is used interchangeably throughout this report with the number of users who "like" a page using the thumbs up icon.

The selection of "science-related" pages was based on each page's self-statement that it covers content about science or any of the following science topics: health/medicine, food/nutrition, astronomy, physics, biology/animal science, neurology, chemistry, technology/engineering, energy/environment, geosciences, math, or social and behavioral sciences. The categories broadly align with the major fields of scientific inquiry as defined by the National Science Foundation.

Commercial pages aimed primarily at selling consumer products were excluded, as were advocacy pages such as The Breast Cancer Site and PETA. Pages that covered a range of health/medicine topics were eligible for selection but those that focused exclusively on exercise or recipes were not.

There is no definitive list of science-related Facebook pages. (Facebook offers a list of science pages on its site, but the list is not exhaustive.) To create the list of popular pages analyzed in this study, five researchers searched for pages with a large number of page likes using a variety of methods in June 2017. Using Facebook's search function, numerous blogs and articles, and results from searches on sites such as Google and trackalytics.com, the Center compiled a list of more than 200 English-language science-related pages that met the above criteria. Only pages with at least 2 million page likes were recorded since pages with fewer followers would not have enough to qualify among the top 30 pages. Each page was classified into one of two groups: a Facebook-primary page or a multiplatform page. The top 15 most popular pages from each group were selected for this study.

A page was considered a Facebook-primary page if it was run by an individual *or* an organization that used Facebook as their primary way of disseminating information. In some cases, such as IFLScience and ScienceAlert, Facebook was central to the creation and growth of their content and audience. In other cases, such as Stephen Hawking, Bill Nye or Neil deGrasse Tyson, prominent

scientists were public figures prior to the creation of Facebook, yet the social media site has enabled these people to reach larger audiences.

Multiplatform pages were run by organizations whose primary method of communication was a media outlet that existed prior to the growth of Facebook as a social media platform. National Geographic, for example, has had a popular magazine and television channel for years. Women's Health and Popular Science are best known for their traditional magazines rather than their social media presence. The pages for NASA and NASA Earth represent a government agency that has existed for decades.

Content Analysis of Facebook pages

Historical data from Facebook Graph API

Pew Research Center downloaded the details for all posts from the selected pages from Jan. 1, 2014, to June 30, 2017, from version 2.8 of the Facebook Graph API. Using Python scripts, details were collected regarding each post's creation date, ID, description, caption, link, permalink and the total number of shares, comments, likes and other reactions. In total, details were collected for 340,333 posts from the 30 Facebook pages.

For posts created from January 2014 to March 2017, the details were downloaded from the API during the months of April and May 2017. For posts created from April to June 2017, the details were downloaded during July 2017. Because the numbers of comments, shares, and likes and other reactions can increase over time, the numbers included in this study reflect the numbers at the time of capture.

Data from the following dates/pages were not available from the Facebook API: Interesting Engineering from Jan. 1-April 13, 2014; Dr. Mehmet Oz from Jan. 1-April 29, 2014; Science Channel from Jan. 1-Sept. 19, 2015; and BBC Earth from Jan. 31-March 27, 2014.

Posts for the page Daily Health Tips were missing from the Facebook API for Jan. 7-April 11, 2017. However, researchers were able to manually capture the ID for each of those missing posts and consequently download the accompanying details of all posts during that time. Therefore, those Daily Health Tips posts are included in the study.

Facebook's API is missing data for large numbers of posts in the second half of 2017 for at least 20 of the 30 pages in the sample. In their forums in early 2018, Facebook acknowledged problems with the API that resulted in the absence of some posts. Therefore, in this report the annual

number of posts for 2017 is estimated based on doubling the volume of posts that appeared in the first six months of the year.

Posts that were produced during the sample time period but were removed by the pages themselves prior to the collection of data by the Center were not included in this study.

The total number of interactions for each post was the sum of all comments, shares and number of reactions (including clicking on icons for 'like' and other reactions such as 'wow,' 'sad' or 'love.') In this study, the total number of interactions is the primary metric used to indicate audience engagement.

For some posts, the numbers of shares were not available through the Facebook API. For the sake of consistency, the numbers of shares were considered zero when compiling the total number of interactions for those posts.

The number of shares and comments are from the Facebook page URL only. If a page posted a link to a video located on another Facebook page, any data regarding shares and comments on that secondary page were not counted. For example, this April 11, 2016, video on Bill Nye's page linked to a video on the GQ Facebook page. That post received 1,962 comments and seven shares on Bill Nye's page at the time of capture, which were counted for this study. On the GQ page, that video received around 75,000 shares and more than 3,000 comments. Those 78,000 interactions were not included in this study since they did not appear on the specific science-related page in this sample.

The link provided by the Facebook API was the URL of the main link featured in each post. In many cases this was a link to the website of the same organization as the Facebook page. In other cases, the link was to another website produced by a different organization. In a few cases, posts did not include any links at all.

Human coding

In order to examine the specific content and format of posts from these Facebook pages, researchers performed detailed content analysis coding of a random sample of posts from Jan. 1 to June 30, 2017. To control for the different frequency of posts, the Center coded an equal number of posts – 250 – appearing during that six month period from each page. Half of the randomly selected posts appeared during the first three months of 2017, while the other half came from the

next three months of 2017.[15] For pages that did not have at least 250 posts during those six months, all the posts appearing during the six month period were coded.

For some posts originally selected for the sample, the Facebook post was available, but the content linked to from that post was no longer active. In those cases, those posts were excluded from the coding sample and replaced by another randomly selected post. (The details for these posts *were* still included in the historical data in this study.)

For each post, coders considered any text or video that appeared on the original Facebook page, along with any text or other information that appeared in the content that was linked to by that Facebook post. Comments were excluded. In total, 6,582 posts were included as part of the human coding sample. See the Appendix for details on the number of sampled posts.

Coded variables in this study were as follows:

- **Primary science topic:** The topic or research area that best fits the content of the post. There were 22 topics, although several were combined for the final analysis. Some posts were classified as having a "non-science" topic. If more than one topic area was discussed, the area that received more time or space was coded as primary.
- **Primary storyline:** The specific topic or theme of the post. There were 36 storylines, although some were later combined. Storylines were sometimes quite specific, such as the "March for Science on April 22, 2017," and sometimes related to broader themes, such as vaccines or climate change. Many posts did not include mentions of any of the storylines and were given the equivalent of an "NA" for this variable. If two or more storylines were mentioned in a post, the storyline that received the most mentions was coded as primary.
- **Primary frame**: The main goal or focus of the post. There were 15 frames coded. If two or more frames were present in a post, researchers coded the focus that received the most time or space as primary.
- **Link to external evidentiary research:** The presence or absence of a link to external research in the post or the accompanying article. This usually included a link to a scientific journal article but could also include links to original research by government agencies or other institutions. For a link to be counted, it had to either have a hyperlink to the research or provide enough clear bibliographical information that a reader could easily find the research in question. Only research links external to the particular Facebook page counted. Therefore, if a post on NASA's Facebook page included a link to original research that was conducted by

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[15] One exception to this selection method occurred for posts from Daily Health Tips. Only six posts were created from this page in the first three months of 2017, while 394 were created during the next three months. For this page, all posts were randomly selected from those appearing at any time during the six month period.

NASA itself, it did not count as an *external* link. While some pages, such as Hashem Al-Ghaili's Science Nature Page, occasionally place links to a scientific publication in their comment section, these were not included as external links in the post.

- **Producer of content**: The organization responsible for the creation of the content in the post. For many posts, the content was written and published by the same Facebook page where the post appeared. In some cases, posts link to articles that were originally produced by another organization. Coders logged the name of the organization responsible for the original text or video in the post. Once the coding was completed, researchers categorized the producers assigned to each post as either produced by the same organization running the Facebook page or a different organization. The producer code was considered to be the same organization if the post and accompanying website were both owned by the same company. For example, links from posts on the MythBusters Facebook page to Discovery.com were considered the same organization since they are both owned by Discovery Communications Inc.. When a post linked to a website that included content from many producers, such as YouTube or Twitter, researchers followed the link to determine if the material appearing on that site was created by the same organization as the Facebook post or by a different organization.

To test the validity of the coding, four researchers classified the same set of 121 posts on five variables. For the three more complex variables, an additional 35 posts were also coded by each person. Intercoder agreement ranged from 80% to 97% across these five classifications. Krippendorf alpha ranged from .71 to .84.

Data of Twitter pages

Data regarding the number of followers for Twitter accounts discussed in this report was collected as of Jan. 31, 2018. Data regarding the number of tweets posted in 2017 was collected using Crimson Hexagon.

Intercoder testing results

Variable name	Number of posts	Percent agreement	Krippendorf alpha
Primary science topic	156	82%	.806
Primary storyline	156	85	.713
Primary focus	156	80	.732
Link to evidentiary research	121	93	.844
Producer of content	121	97	.766

Source: Pew Research Center analysis of randomly selected Facebook posts from 30 science-related pages, January to June 2017. Data collected from the public Facebook Graph API. "The Science People See on Social Media"

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Appendix

Facebook-primary pages included in the study

1. IFLScience: science Facebook page founded in March 2012 by British blogger Elise Andrew
2. Health Digest: self-described "wellness" page for the website HealthDigezt.com that offers food and health tips
3. David Wolfe: entrepreneur and author known for promoting raw foods and natural health treatments
4. ScienceAlert: science website founded in 2007 based in Australia with a team of writers and editors
5. Hashem Al-Ghaili (@ScienceNaturePage): page run by a science communicator based in Germany that is aimed at educating "the public through social media and video content"
6. Interesting Engineering: media company aimed at "connecting likeminded engineers around the globe"
7. Smart is the New Sexy (@enjoy.science): general science page owned by TheSoul Publishing, which also runs sites such as 5-Minute Crafts and Bright Side
8. Dr. Mehmet Oz: surgeon and author who has hosted a daily television show since 2009
9. Bill Nye: TV host and author commonly known as "the Science Guy" who produced a series for Netflix in 2017
10. Neil deGrasse Tyson: astrophysicist, author and head of the Hayden Planetarium in New York who hosts the radio show StarTalk
11. Stephen Hawking: theoretical physicist, author and former Director of Research at the Centre for Theoretical Cosmology at the University of Cambridge
12. ScienceDump: general science page that serves as a curator of news that aims to "deliver science in a fun and entertaining way to millions every week"
13. mindbodygreen: a lifestyle media brand founded by Jason Wachob that takes "a 360 degree approach to wellness"
14. Daily Health Tips: page run by healthcaremagic.com, a company that claims to be the largest paid health Q&A site in the world
15. Dr. Michio Kaku: theoretical physicist, professor at The City College of New York and author who makes frequent television appearances

Multiplatform pages included in the study

1. National Geographic: founded in 1888, the non-profit National Geographic Society published its first magazine issue that year and currently runs its own television channel
2. Discovery: page for the Discovery Channel, a cable station founded in 1985 that has focused on popular science and reality programming, owned by Discover Communications Inc.
3. Animal Planet: cable television channel owned by Discovery Communications Inc. launched in 1996
4. NASA: page for the National Aeronautics and Space Administration, a U.S. government agency
5. NASA Earth: page run by NASA that "uses the vantage point of space to increase our understanding of our home planet"
6. Women's Health: founded in 2005, the magazine focuses on nutrition, health and lifestyle stories for women
7. Psychology Today: magazine that is devoted to new developments in the field of psychology first launched in 1967
8. Science Channel: cable television channel owned by Discovery Communications Inc. that features shows on popular science
9. MythBusters: television show featuring various experiments that debuted on the Discovery Channel in 2003 and was relaunched in November 2017, owned by Discovery Communications Inc.
10. BBC Earth: brand used by the British Broadcasting Company to distribute natural history and science content
11. Health: Facebook page focused on women's health and connected with the monthly Health magazine and website health.com
12. New Scientist: weekly magazine founded in 1956 that focuses on developments in science and technology
13. Science magazine: peer-reviewed academic journal of the American Association for the Advancement of Science (AAAS) first published in 1880
14. Popular Science: bimonthly magazine first published in 1872 that features articles on science and technology aimed at a general audience
15. Physics Today: magazine founded in 1948 and published by the American Institute of Physics

The most popular science-related Facebook pages had 3 million to 44 million followers

Figures for each Facebook page as of June 2017

Facebook-primary	Number of page likes	Number of posts Jan. 2014 – June 2017	Sample size of coded posts Jan. – June 2017	Multiplatform	Number of page likes	Number of posts Jan. 2014 – June 2017	Sample size of coded posts Jan. – June 2017
IFLScience	25.6 million	12,431	250	National Geographic	44.3 million	11,541	250
Health Digest	11.1 million	26,233	250	Discovery	39.0 million	10,720	250
David Wolfe	10.9 million	8,853	250	Animal Planet	20.0 million	13,650	250
ScienceAlert	9.1 million	12,657	250	NASA	19.4 million	7,977	250
Hashem Al-Ghaili (@ScienceNaturePage)	8.4 million	2,234	250	NASA Earth	9.6 million	2,718	250
Interesting Engineering	7.4 million	7,355*	250	Women's Health	8.2 million	48,202	250
Smart is the New Sexy (@enjoy.science)	7.3 million	8,353	250	Psychology Today	7.5 million	5,432	250
Dr. Mehmet Oz	6.0 million	2,657*	250	Science Channel	7.4 million	9,743*	250
Bill Nye	4.8 million	262	42	MythBusters	6.8 million	2,505	194
Neil deGrasse Tyson	4.0 million	675	65	BBC Earth	6.8 million	5,421*	250
Stephen Hawking	3.9 million	112	12	Health	6.6 million	36,494	250
ScienceDump	3.6 million	12,775	250	New Scientist	3.6 million	21,323	250
mindbodygreen	3.2 million	36,160	250	Science magazine	3.5 million	3,590	250
Daily Health Tips	3.1 million	3,051	250	Popular Science	3.5 million	22,394	250
Dr. Michio Kaku	3.0 million	275	19	Physics Today	3.0 million	4,540	250

* indicates that some information about posts was missing from the Facebook API and are not included in this study.
Note: Number of page likes as of June 12, 2017. Hashem Al-Ghaili's Science Nature Page began posting on July 29, 2015, and Smart is the New Sexy began posting on April 29, 2016. Data for posts on Interesting Engineering were not available from Jan. 1 to April 13, 2014. Posts on Dr. Mehmet Oz's page were missing from Jan. 1 to April 29, 2014. Posts from Science Channel were missing from Jan. 1 to Sept. 19, 2015. Posts from BBC Earth were missing from Jan. 31 to March 27, 2014. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of all Facebook posts from 30 science-related pages, January 2014 to June 2017. Data collected from the public Facebook Graph API.
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Volume of posts for each of these Facebook pages 2014-2017

The annual number of Facebook posts from each page, January 2014 to June 2017

Facebook-primary	2014	2015	2016	2017 estimated	Multiplatform	2014	2015	2016	2017 estimated
IFLScience	4,539	4,172	2,523	2,394	National Geographic	2,472	3,324	3,803	3,884
Health Digest	7,144	6,561	8,358	8,340	Discovery	2,813	3,178	3,949	1,560
David Wolfe	105	2,230	3,423	6,190	Animal Planet	1,618	4,366	4,959	5,414
ScienceAlert	2,812	3,607	4,491	3,494	NASA	2,018	2,210	2,406	2,686
Hashem Al-Ghaili's (@ScienceNaturePage)	NA	489	837	1,816	NASA Earth	647	617	955	998
Interesting Engineering*	1,081	1,561	2,983	3,460	Women's Health	8,312	11,764	18,822	18,608
Smart is the New Sexy (@enjoy.science)	NA	NA	4,198	8,310	Psychology Today	1,456	1,594	1,586	1,592
Dr. Mehmet Oz*	480	758	896	1,046	Science Channel*	1,169	986	5,075	5,026
Bill Nye	59	89	72	84	MythBusters	943	771	591	400
Neil deGrasse Tyson	234	223	153	130	BBC Earth*	354	1,975	1,994	2,196
Stephen Hawking	20	41	39	24	Health	6,592	9,927	13,253	13,444
ScienceDump	3,375	3,444	3,228	5,456	New Scientist	3,434	5,287	7,287	10,630
mindbodygreen	9,244	11,466	10,384	10,132	Science magazine	641	773	1,433	1,486
Daily Health Tips	1,803	729	119	800	Popular Science	2,705	4,254	10,327	10,216
Dr. Michio Kaku	195	33	28	38	Physics Today	1,595	1,307	1,099	1,078

* indicates that some information about posts was missing from the Facebook API.

Note: The number of posts for 2017 is estimated based on doubling the amount of posts that appeared in the first six months of the year because of missing data in Facebook's API. NA indicates data not available. Data for posts on Interesting Engineering were not available from Jan. 1 to April 13, 2014. Posts on Dr. Mehmet Oz's page were missing from Jan. 1 to April 29, 2014. Posts from Science Channel were missing from Jan. 1 to Sept. 19, 2015. Posts from BBC Earth were missing from Jan. 31 to March 27, 2014. "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet. "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.

Source: Pew Research Center analysis of all Facebook posts from 30 science-related pages, January 2014 to June 2017. Data collected from the public Facebook Graph API.

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Facebook-primary pages: Many science-related pages publish posts on just one or two topics

% of each Facebook page's posts about each topic

	Health/ medicine	Food/ nutrition	Engineer-ing/tech	Behavior-al sciences	Energy/ environ-ment	Animal science	Astronomy /physics	Neurology	Archeology	Geology	Math	Chemistry	Spiritual-ity	Para-normal	Travel	Feats/ phenom-ena	General	Non-science
Daily Health Tips	65	27	0	2	0	0	0	4	0	0	0	0	0	0	0	0	<1	3
Health Digest	59	30	1	<1	<1	0	0	6	<1	0	0	0	0	0	0	0	1	3
Dr. Mehmet Oz	48	31	1	3	0	0	0	5	0	0	0	0	1	0	<1	0	6	5
mindbodygreen	27	22	0	15	1	0	0	12	0	0	0	<1	9	1	2	0	6	5
David Wolfe	26	10	6	12	4	4	1	4	<1	<1	<1	0	1	<1	<1	1	2	28
Hashem Al-Ghaili (@ScienceNature Page)	26	1	24	1	13	9	10	5	2	1	1	2	0	0	<1	0	4	1
ScienceAlert	17	<1	14	1	8	8	27	6	4	4	<1	3	0	1	0	0	5	<1
ScienceDump	16	5	14	6	9	8	9	13	2	1	2	1	0	0	2	2	6	6
Smart is the New Sexy (@enjoy.science)	14	6	12	5	1	3	2	2	0	0	2	1	0	<1	2	5	13	32
IFLScience	11	2	5	4	17	18	19	5	7	3	1	<1	0	1	0	<1	4	1
Interesting Engineering	3	1	70	1	6	0	12	0	<1	0	<1	0	0	0	0	<1	3	2
Bill Nye	2	0	3	2	14	0	5	0	0	2	0	0	2	0	0	0	67	2
Neil deGrasse Tyson	0	2	2	2	2	0	48	0	0	0	0	0	0	0	0	0	37	9
Stephen Hawking	0	0	8	0	0	0	58	0	0	0	0	0	0	0	0	0	25	8
Dr. Michio Kaku	0	0	0	0	0	0	58	0	0	5	0	0	0	0	0	0	32	5
Total	27	12	13	4	5	4	9	5	1	1	1	1	1	<1	1	1	6	8

Note: "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet.
Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.
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Multiplatform pages: Many science-related accounts publish posts on just one or two topics

% of each Facebook page's posts about each topic

	Health/ medicine	Food/ nutrition	Engineer-ing/tech	Behavior-al sciences	Energy/ environ-ment	Animal science	Astronomy /physics	Neurology	Archeology	Geology	Math	Chemistry	Spiritual-ity	Para-normal	Travel	Feats/ phenom-ena	General	Non-science
Women's Health	48	12	1	24	0	0	0	2	0	0	0	0	<1	0	0	1	<1	12
Health	47	29	<1	3	0	0	<1	6	0	0	0	0	0	0	1	0	1	13
Science magazine	24	2	7	4	7	16	8	4	4	1	0	2	<1	0	0	<1	20	0
New Scientist	16	1	14	2	8	18	19	8	3	2	0	1	0	0	1	0	7	0
Popular Science	12	4	34	1	8	10	18	3	2	<1	0	2	0	0	0	0	5	1
Animal Planet	8	<1	2	0	<1	75	0	0	0	0	0	0	0	5	<1	0	8	<1
BBC Earth	4	0	1	<1	13	56	5	2	8	4	0	0	0	1	1	0	4	0
National Geographic	3	<1	1	2	14	50	4	2	8	1	0	0	0	0	8	<1	4	1
Psychology Today	2	0	1	73	0	2	0	21	0	0	0	0	0	0	0	0	<1	<1
MythBusters	2	3	19	1	4	5	24	3	0	0	1	0	0	0	0	0	34	5
Science Channel	1	2	23	0	8	6	37	1	4	1	<1	1	<1	1	0	<1	11	2
Discovery	1	<1	6	0	7	28	7	0	2	<1	1	<1	<1	0	2	2	43	0
NASA	1	<1	3	0	10	1	80	0	0	1	0	0	0	0	0	0	4	1
Physics Today	1	0	4	<1	7	3	64	1	1	<1	4	2	0	0	0	0	13	<1
NASA Earth	<1	0	2	0	73	<1	12	0	<1	9	0	0	0	0	1	0	2	1
Total	11	4	8	8	11	18	19	3	2	1	<1	<1	<1	<1	1	<1	10	2

Note: "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.
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Facebook-primary pages: The frame of most posts tends to vary among science-related pages

% of each Facebook pages' posts using each frame

	New discoveries	Explanations of concepts	'News you can use'	Promotions /ads	Visual	Calls to action	Profiles of scientists	Conflicting findings	Research misconduct /bias	Media coverage of science	Research funding	Education issues	Travel	Archived reposts	Topic is not science-related
ScienceAlert	72	10	4	4	1	1	1	2	0	0	<1	0	0	3	<1
IFLScience	68	6	5	4	1	2	1	2	0	0	6	<1	0	4	1
Hashem Al-Ghaili (@ScienceNaturePage)	50	30	2	5	5	0	2	0	<1	0	0	<1	<1	4	1
ScienceDump	47	20	5	1	3	1	1	<1	0	0	<1	0	2	14	6
Interesting Engineering	35	27	7	12	7	1	4	0	1	<1	<1	1	0	2	2
Daily Health Tips	0	1	96	0	0	<1	0	<1	0	0	0	0	0	0	3
Health Digest	1	2	85	0	<1	<1	0	0	0	0	0	0	0	8	3
Mindbodygreen	6	1	69	2	0	1	<1	<1	0	0	0	0	2	15	5
David Wolfe	12	8	37	5	3	2	<1	0	0	<1	0	0	<1	4	28
Smart is the New Sexy (@enjoy.science)	4	14	29	5	6	1	1	0	0	0	0	0	2	6	32
Dr. Michio Kaku	0	5	0	79	5	0	0	0	0	0	0	5	0	0	5
Neil deGrasse Tyson	0	0	0	78	2	2	2	0	0	0	3	2	0	3	9
Bill Nye	5	17	0	64	5	5	0	0	0	0	2	0	0	0	2
Stephen Hawking	0	0	0	58	0	17	8	0	0	0	0	0	0	8	8
Dr. Mehmet Oz	4	6	26	39	0	10	<1	0	0	<1	0	0	<1	8	5
Total	26	11	32	10	3	2	1	<1	<1	<1	1	<1	1	6	8

Note: "Facebook-primary" consists of Facebook pages from individuals or organizations that have a large social media presence on the platform but are not connected to any offline, legacy outlet.
Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.
"The Science People See on Social Media"

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Multiplatform pages: The frame of most posts tends to vary among science-related pages

% of each Facebook pages' posts using each frame

	New discoveries	Explanations of concepts	'News you can use'	Promotions /ads	Visual	Calls to action	Profiles of scientists	Conflicting findings	Research misconduct/ bias	Media coverage of science	Research funding	Education issues	Travel	Archived reposts	Topic is not science-related
NASA Earth	71	10	0	5	1	4	<1	0	0	0	<1	0	1	7	1
New Scientist	69	8	3	5	<1	2	3	1	<1	0	6	0	1	2	0
Science magazine	61	4	3	12	0	2	4	<1	2	<1	5	1	0	4	0
NASA	54	12	2	20	2	5	1	<1	0	<1	1	<1	0	<1	1
Physics Today	40	15	1	2	<1	1	29	1	1	1	2	4	0	2	0
National Geographic	39	26	0	11	3	4	1	0	0	1	1	0	8	5	1
Popular Science	37	13	14	2	0	<1	2	<1	0	<1	2	0	0	27	1
BBC Earth	27	23	1	16	5	3	1	2	0	2	<1	0	1	20	0
Science Channel	24	26	1	40	2	2	2	<1	0	0	0	0	0	1	2
Health	12	4	56	2	0	1	0	0	<1	0	0	0	1	11	13
Psychology Today	10	9	67	<1	0	0	0	<1	0	0	0	0	0	12	<1
Women's Health	8	7	40	2	0	1	<1	0	0	0	0	0	0	30	12
MythBusters	6	21	1	54	5	3	2	0	0	3	0	0	0	2	5
Discovery	5	10	2	65	14	1	<1	0	0	<1	0	0	2	<1	0
Animal Planet	5	3	6	79	2	4	<1	0	0	0	0	0	<1	0	<1
Total	32	13	13	21	2	2	3	<1	<1	<1	1	<1	1	8	2

Note: "Multiplatform" includes Facebook pages from established outlets or organizations, such as magazines, TV programs or government agencies.
Source: Pew Research Center analysis of a random sample of Facebook posts from 30 science-related pages, January to June 2017. Data from the public Facebook Graph API.
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