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Many Turn to YouTube for Children's Content, News, How-To Lessons

An analysis of videos suggested by the site's recommendation engine finds that users are directed toward progressively longer and more popular content

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Many Turn to YouTube for Children’s Content, News, How-To Lessons

An analysis of videos suggested by the site’s recommendation engine finds that users are directed toward progressively longer and more popular content

The video-sharing platform YouTube is one of the most prominent destinations on the web. [A majority of Americans](#) across a wide range of demographic groups are YouTube adopters, with younger Americans standing out as especially avid users of the site.

A new Pew Research Center survey of U.S. adults finds that these users are turning to YouTube for much more than entertainment. Roughly half of YouTube users say the platform is very important for helping them figure out how to do things they’ve never done before. That works out to 35% of all U.S. adults, once both users and non-users of the site are accounted for. And around one-in-five YouTube users (representing 13% of the total adult population) say it is very important for helping them understand events that are happening in the world.

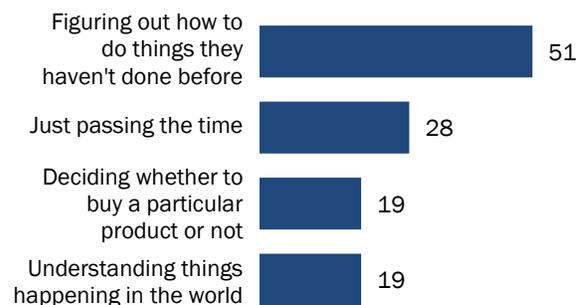
The findings also highlight YouTube’s key role in providing content for children. Fully 81% of *all* parents with children age 11 or younger say they ever let their child watch videos on YouTube.

And 34% of parents say their child watches content on YouTube regularly. It should be noted that YouTube explicitly states that the platform is not intended for children younger than 13, and that the site provides a YouTube Kids option for children that has enhanced parental controls.

But even as many users are turning to content on YouTube to help them understand the world and learn new things, large shares say they encounter negative experiences with content on the platform. Around two-thirds of users (64%) say they at least sometimes encounter videos that seem obviously false or untrue while using the site, while 60% at least sometimes encounter videos that show people engaging in dangerous or troubling behavior. And among parents who let their

One-in-five YouTube users say it is very important for helping them understand things that are happening in the world

% of U.S. adults who use YouTube who say the site is very important when it comes to ...



Note: Respondents who did not give an answer are not shown.
Source: Survey of U.S. adults conducted May 29-June 11, 2018.
“Many Turn to YouTube for Children’s Content, News, How-To Lessons”

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young child watch content on the site, 61% say they have encountered content there that they felt was unsuitable for children.

The survey also illustrates the prominent role the site's recommendations play in its users' consumption habits. These "up next" videos are selected by the site's algorithm and appear alongside or below the video viewers are currently watching. Depending on a user's individual settings, these videos may play automatically once the video they are watching has finished. Some 81% of YouTube users say they at least occasionally watch the videos suggested by the platform's recommendation algorithm, including 15% who say they do this regularly, according to the survey.

Although the site's recommendations drive a significant share of its users' time on the site, the inner workings of the algorithm itself are largely opaque. To further understand the nature of the video recommendations on YouTube, the Center conducted a companion analysis of the videos suggested by the site's recommendation algorithm. To do this, we conducted more than 170,000 "random walks" through the videos recommended to viewers of popular YouTube channels using the site's public application programming interface (API) over a six-week period in summer 2018.

These random walks worked by:

- 1) Selecting a video at random from a custom list of more than 14,000 popular English-language YouTube channels (defined as those with at least 250,000 subscribers), based on one of four selection criteria also chosen at random.
- 2) Selecting one of the five recommended videos listed in the YouTube API for that video.
- 3) Repeating the above step until a total of five videos – the initial starting video plus four subsequent recommendations – had been collected.

All told, these 174,117 random walks resulted in 696,468 total encounters with 346,086 unique recommended videos. For more detail on how this analysis was conducted, see the [Methodology](#) at the end of this report.

A key finding of this analysis is that the YouTube recommendation system encourages users to watch progressively longer and more popular content. The videos selected in the first step of these random walks averaged 9 minutes, 31 seconds in length. The first recommended video tied to this initial choice ran, on average, nearly three minutes longer. By the fifth and final step in these walks, the site recommended videos that averaged nearly 15 minutes in length.

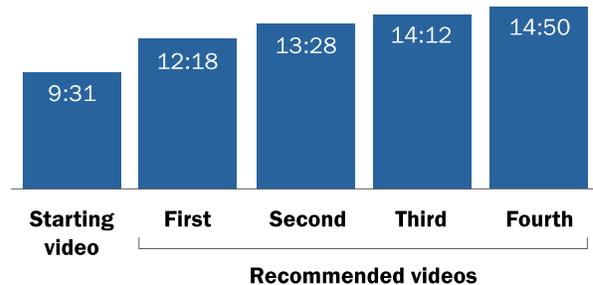
The recommendation engine similarly recommends ever-more-popular videos. The initial starting videos in these random walks averaged just over 8 million views. But the first videos recommended by the site average nearly 30 million views. And by the final step, these videos have an average of more than 40 million views.

This study of YouTube’s recommendation algorithm also reinforces the survey findings about the prominence of children’s content on YouTube. All told, 134 unique videos were recommended more than 100 times during this analysis. And of the 50 individual videos that were encountered most frequently, 11 of them – or about a fifth of the most-recommended videos – were determined by researchers to be oriented toward children, based on their content. Indeed, an animated video for children was the single most recommended video in this analysis.

The findings in this report are based on two different sources. The insights about YouTube users’ attitudes and experiences on the platform are taken from a nationally representative survey of 4,594 U.S. adults conducted May 29-June 11, 2018. The findings about YouTube recommendations are drawn from an analysis of more than 170,000 “random walks” through the platform’s video recommendations for videos posted by high-subscriber YouTube channels, performed July 18-Aug. 29, 2018, using the site’s public API.

YouTube recommendations point users to progressively longer content

Average video length (min:sec)



Source: Analysis of recommended videos collected via 174,117 five-step “random walks” beginning with videos posted to English-language YouTube channels with at least 250,000 subscribers, performed using the public YouTube API. Data collection performed July 18-Aug. 29, 2018.

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The views and experiences of YouTube users

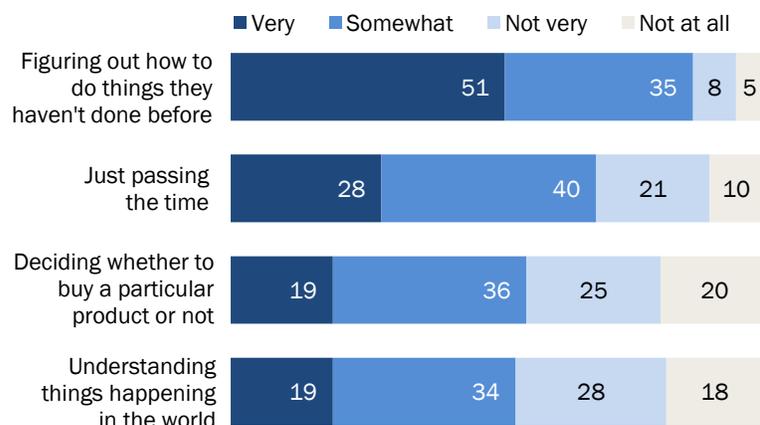
Although YouTube was not explicitly developed as a news platform, substantial shares of its users get news content from the site and use it to make sense of the world around them. [A recent study](#) by the Center found that the share of YouTube users who get news or news headlines there nearly doubled between 2013 (20%) and 2018 (38%). And this new survey finds that around half (53%) of YouTube users say the site is at least somewhat important for helping them understand things that are happening in the world – with 19% saying it is *very* important to them for this reason.

These users are also turning to YouTube for reasons other than news. Around seven-in-ten (68%) say the site is important simply for helping them pass the time (with 28% saying it is *very* important to them for this reason). Around half (54%) say it is important for helping them make purchasing decisions. Younger adults are especially likely to say that YouTube is important to them for passing the time. Four-in-ten users ages 18 to 29 say the site is very important to them for this reason, but that share falls to 30% among users ages 30 to 49, 20% among users 50 to 64 and 14% among users 65 and older.

At the same time, a large share of YouTube users say the site is important for helping them figure out how to do things they haven't done before. Fully 87% of users say the site is important for this reason, with 51% saying it is *very* important. And the ability to learn how to do new things is important to users from a wide range of age groups. Roughly half (53%) of users ages 18 to 29 say the site is very important to them for this reason, and that view is shared by 41% of users ages 65 and older.

One-in-five YouTube users say it is very important for helping them understand things that are happening in the world

% of U.S. adults who use YouTube who say the site is ___ important when it comes to ...



Note: Respondents who did not give an answer are not shown.

Source: Survey of U.S. adults conducted May 29-June 11, 2018.

"Many Turn to YouTube for Children's Content, News, How-To Lessons"

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In some cases, users' responses to these questions show substantial variation based on how frequently they visit the site. Most notably, people who use the site regularly place an especially high level of importance on YouTube for learning about world events. Some 32% of users who visit the site several times a day – and 19% of those who visit once a day – say it is *very* important for helping them understand things that are happening in the world. That compares with 10% of users who visit less often.

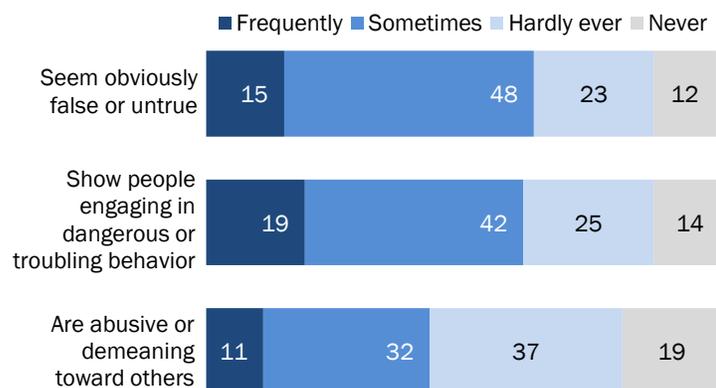
In other cases, more- and less-frequent users of YouTube have similar views of the platform's importance. For instance, a 56% majority of users who visit multiple times per day say the site is very important in helping them figure out how to do new things. But that view is also shared by a plurality (46%) of those who use the site less than once per day.

It is common for users to encounter troubling or problematic content on YouTube

Even as many YouTube users say the site plays an important role in helping them navigate various aspects of their lives, it can also be a space where they encounter troubling or problematic content. Around two-thirds of users (64%) say they at least sometimes encounter videos that seem obviously false or untrue while using the site. A similar share (60%) say they at least sometimes encounter videos that show people engaging in dangerous or troubling behavior. A minority of users also say they see videos that are abusive or demeaning toward others – and 11% say they see this type of content frequently.

Majority of YouTube users encounter videos that seem false/untrue, or show people doing dangerous things

% of U.S. adults who use YouTube who ___ notice videos on the site that ...



Note: Respondents who did not give an answer are not shown.

Source: Survey of U.S. adults conducted May 29-June 11, 2018.

"Many Turn to YouTube for Children's Content, News, How-To Lessons"

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For the most part, users with various demographic characteristics tend to encounter these types of videos with similar frequency – although men are somewhat more likely than women to at least sometimes encounter videos showing people engaging in dangerous or troubling behaviors (67% vs. 54%).

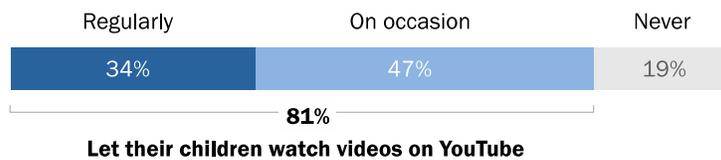
A sizable majority of parents of young children let their child watch videos on YouTube

These survey results also highlight the prominent role that YouTube plays in the lives of parents and children. Some 81% of *all* parents with children age 11 or younger let their child watch videos on YouTube, with 34% indicating that they allow their child to do this regularly.¹

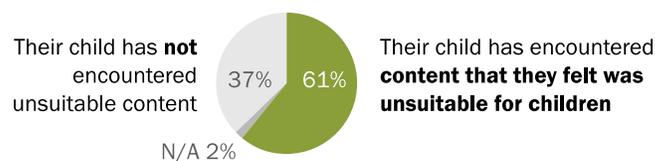
Additionally, the survey shows that 61% of these parents say their child has encountered content on YouTube that they felt was unsuitable for children. However, it is important to note that the survey did not ask parents whether they allowed their child to watch the standard YouTube or [YouTube Kids](#), which is a special product with greater levels of parental control and monitoring. YouTube provides parents with a [YouTube Kids Parental Guide](#) which describes how families can use the product.

Around one-third of parents of young children regularly let their child watch videos on YouTube

% of U.S. parents with children age 11 or younger who say they let their child/children watch videos on YouTube ...



Of the 81% who let their kids watch YouTube, % who say ...



Source: Survey of U.S. adults conducted May 29-June 11, 2018.
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¹ When asked how often they let their child watch YouTube videos, 8% of respondents indicated that they do not have any children age 11 or younger. The results reported here have been recalculated to exclude these respondents.

An analysis of random walks through the YouTube recommendation engine

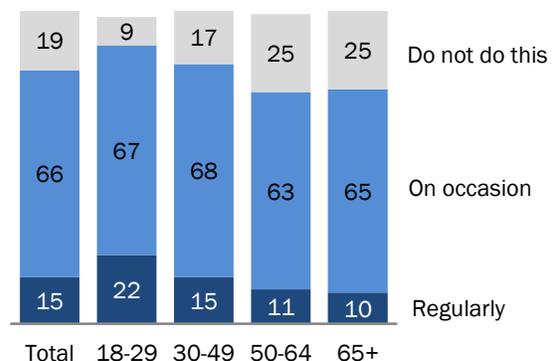
Much like the [Facebook News Feed](#), YouTube’s video recommendation system is a prominent example of algorithmic content delivery. At the 2018 CES conference, YouTube’s chief product officer said the site’s recommendation engine is responsible for more than [70% of users’ time spent](#) watching videos on the platform. These sorts of recommendation systems seek to draw viewers to content that is more engaging to them, potentially keeping them on the site for longer periods of time. But researchers such as Zeynep Tufekci, an associate professor at the University of North Carolina’s School of Information and Library Science, [have argued](#) that these systems can push viewers toward extreme content that they might not have discovered otherwise.

This survey finds that roughly eight-in-ten YouTube users (81%) say they watch recommended videos – with 15% saying they watch these videos regularly. And younger users are especially likely to regularly follow the algorithm’s recommendations. Some 22% of YouTube users ages 18 to 29 say they regularly watch the recommended videos suggested to them, compared with around one-in-ten users ages 50 and older.

To more deeply understand this phenomenon, the Center supplemented these survey findings with a separate “random walks” analysis of popular YouTube channels using the YouTube public API. Over a six-week period spanning July 18-Aug. 29, 2018, the Center performed 174,117 random walks through the videos that the YouTube platform recommends to viewers of English-language channels with at least 250,000 subscribers.

Majority of YouTube users across a wide range of age groups watch recommended videos

% of U.S. adults who use YouTube who say they watch the recommended videos that appear alongside the video they are currently watching ...



Note: Respondents who did not give an answer are not shown.
Source: Survey of U.S. adults conducted May 29-June 11, 2018.
“Many Turn to YouTube for Children’s Content, News, How-To Lessons”

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Each random walk worked as follows:

- First, we used the YouTube API to randomly select a channel from a list of every English-language channel with at least 250,000 subscribers that researchers could identify (14,509 channels in total).
- Upon selecting a channel, we then randomly selected one of the top five videos for that channel as ranked by either relevance, date posted, rating or view count. The criterion used for each walk was chosen randomly prior to selecting a video.
- After selecting the starting video, a new video was then chosen at random from the top five recommended videos for that video, as listed in the YouTube API at that time.
- The above step would then be repeated until a total of five videos (the initial video plus four subsequent recommendations) had been collected.

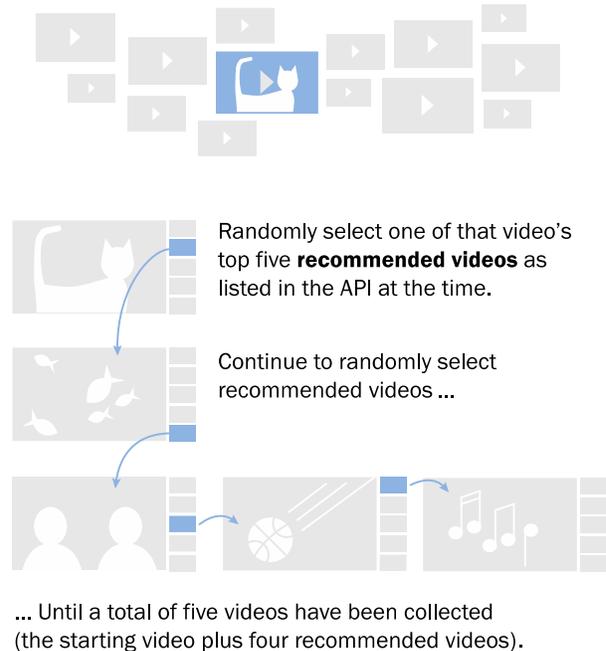
All told, these 174,117 random walks resulted in 696,468 total encounters with 346,086 unique recommended videos. We will discuss in more detail below that these figures are different

because some videos were recommended more than once over the study period. Unless explicitly noted, all findings in this report include only those videos recommended by the site's recommendation algorithm and not the initial starting videos.

Like other content delivery algorithms, the YouTube recommendation engine attempts to customize its suggestions based on an individual user's prior activity and browsing behavior. Thus, different users watching the same video might be served different recommendations based on the system's calculations of their interests. To maintain a consistent methodology built on the likely experiences of a baseline viewer of these popular channels, this analysis utilizes the base recommendations from the YouTube API. As such, these findings represent the recommendations a viewer of these channels might expect to see if they were viewing YouTube anonymously, and/or without being logged into their account.

How the Center conducted the 'random walks' analysis used in this report

Select a video at random from a list of 14,509 popular YouTube channels using the public YouTube API. This is the initial **starting video**.



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Here are some of the key takeaways:

28% of the unique videos in this dataset were recommended multiple times over the study period.

A majority of the recommended videos in this dataset were recommended just a single time. But 98,508 videos (or 28% of the total) were recommended more than once over the study period, suggesting that the recommendation algorithm points viewers to a consistent

set of videos with some regularity. In fact, a small number of these videos (134 in total) were recommended more than 100 times.

The bulk of the videos recommended during these random walks were quite popular – 64% of the recommendations went to videos that had more than 1 million views at the time. At the same time, 5% of the recommendations went to videos that had fewer than 50,000 views when they were recommended.²

YouTube tends to recommend progressively longer and more popular content to users.

This analysis illustrates how YouTube’s recommendation engine encourages users to engage with progressively longer content. The videos encountered in the first step of these random walks (that is, the initial starting videos chosen at random) collectively averaged 9

Certain popular videos were recommended repeatedly in this analysis

% of unique YouTube videos in this analysis that were recommended ...

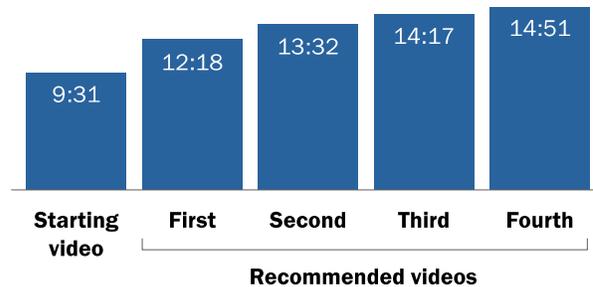


Source: Analysis of recommended videos collected via 174,117 five-step “random walks” beginning with videos posted to English-language YouTube channels with at least 250,000 subscribers, performed using the public YouTube API. Results include only those videos recommended by the YouTube algorithm, and not the initial starting videos. Data collection performed July 18-Aug. 29, 2018. “Many Turn to YouTube for Children’s Content, News, How-To Lessons”

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YouTube recommendations point to progressively longer videos

Average video length (min:sec)



Source: Analysis of recommended videos collected via 174,117 five-step “random walks” beginning with videos posted to English-language YouTube channels with at least 250,000 subscribers, performed using the public YouTube API. Data collection performed July 18-Aug. 29, 2018. “Many Turn to YouTube for Children’s Content, News, How-To Lessons”

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² The figures in this paragraph are based on *all* encounters with a recommended video over the course of the analysis, not just unique videos.

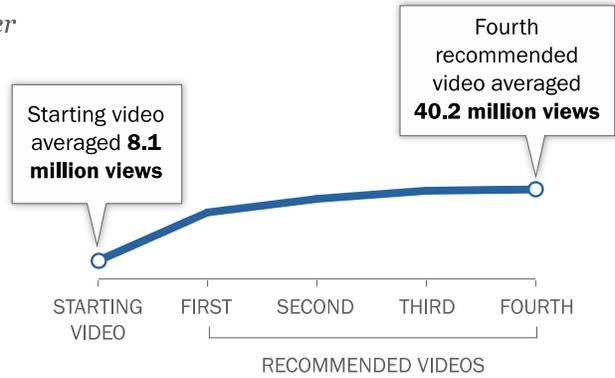
minutes and 31 seconds in length. But the first videos selected by the recommendation engine were nearly three minutes longer on average. Average video length then progressively increased for each subsequent recommendation. By the fifth and final step in these walks, these videos were on average nearly 15 minutes long.

This analysis also illustrates how the site’s recommendation engine steers users toward progressively more popular content as measured by view counts. Collectively, the starting videos in this analysis had an average of just over 8 million views. But the first videos recommended by the algorithm were much more popular, with nearly 30 million views on average. And videos in the final step in these walks had an average of more than 40 million views.

Although the magnitude of the effect is slightly different in each case, this general relationship held true regardless of whether the initial video was chosen based on date posted, view count, relevance or user rating. Even when starting on one of a channel’s five most recent videos (which average fewer

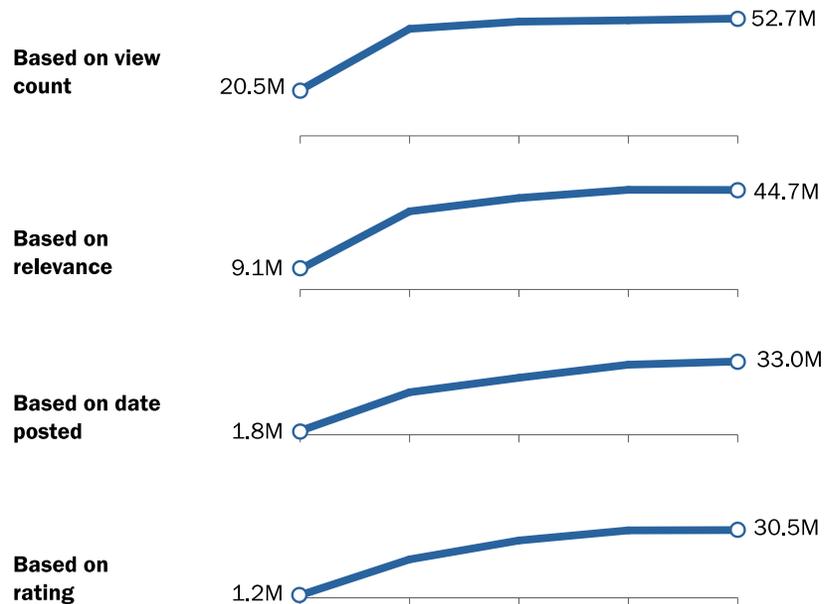
YouTube recommendations point to more popular content – regardless of starting criterion

Average number of views



Average number of views if initial video was chosen ...

The recommendation engine suggests increasingly popular content **no matter which criterion was used to select the starting video**



Source: Analysis of recommended videos collected via 174,117 five-step “random walks” beginning with videos posted to English-language YouTube channels with at least 250,000 subscribers, performed using the public YouTube API. Results include only those videos recommended by the YouTube algorithm, and not the initial starting videos. Data collection performed July 18-Aug. 29, 2018. “Many Turn to YouTube for Children’s Content, News, How-To Lessons”

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than 2 million views) the recommendation algorithm consistently suggested more popular videos. By the fourth recommendation on walks starting from a channel’s most recent videos, viewers were recommended videos with an average of nearly 33 million views.

Music videos, TV competitions and children’s content made up a large share of the 50 most-recommended videos in this analysis

A detailed content analysis of the more than 340,000 unique recommended videos in this dataset is beyond the scope of this study. Therefore, the analysis that follows focuses on the 50 individual videos recommended most frequently over the course of these six weeks. A full list of these 50 videos and a brief description can be found in [Appendix A](#) of this report.

Four specific types of content made up a sizable majority of the 50 most-encountered videos in this analysis. Fourteen of these videos were music videos by major commercial artists, typically the “official” video posted to the channel of the artist who created the work. Eleven were compilation videos showing highlights or surprising moments from televised competition shows. Titles like “Top 10 Most UNFORGETTABLE Singing Auditions ALL TIME” and “UNBELIEVABLE! Top 10 Shocking Blind Auditions the Voice 2018” are representative of this genre.

In keeping with the large share of parents who let their children watch videos on YouTube, a substantial share of these videos (11 in total) were oriented toward small children. In fact, the single video in this dataset

Bulk of the 50 most-recommended videos in this analysis were music videos, TV competitions, children’s content or ‘life hacks’

Composition of the 50 most-recommended videos, by type

Video type	# of videos	Example
Music videos	14	“Luis Fonsi - Despacito ft. Daddy Yankee”
TV competitions	11	“Top 10 Most UNFORGETTABLE Singing Auditions ALL TIME”
Kids	11	“Learn Colors with Spiderman w King Kong 3D Animals Play Fun Games for Kids Cartoon for Children”
Life hacks	7	“27 BEAUTY HACKS THAT WILL SAVE YOU THOUSANDS”
Sports	2	“The Most Amazing Moments in Combat Sports EVER!”
Animals and pets	2	“The Best of Eagle Attacks 2018 - Most Amazing Moments of Wild Animal Fights! Wild Discovery Animals”
Fails	1	“TOP 250 FUNNIEST FAILS IN FORTNITE”
Celebrity	1	“Kylie Jenner Asks Travis Scott 23 Questions GQ”
Inventions	1	“10 Coolest Strongest Toys Which Actually Exist!”

Note: “Video type” determined via categorization by human coders.

Source: Analysis of recommended videos collected via 174,117 five-step “random walks” beginning with videos posted to English-language YouTube channels with at least 250,000 subscribers, performed using the public YouTube API. Results include only those videos recommended by the YouTube algorithm, and not the initial starting videos. Data collection performed July 18-Aug. 29, 2018.

“Many Turn to YouTube for Children’s Content, News, How-To Lessons”

PEW RESEARCH CENTER

with the largest number of total recommendations over the study period (615) was an animated song compilation titled “Bath Song | + More Nursery Rhymes & Kids Songs.”

These frequently recommended children’s videos also highlight the ways in which children’s content on YouTube can differ from more traditional programming for young people. [Numerous researchers](#) have noted that a great deal of children’s content on YouTube consists of simple, repetitive animated videos with modest production values and seemingly random titles designed specifically to appeal to the site’s search function and automated recommendation system. This list of top videos contained several examples of this genre of children’s programming, including titles such as:

- “Learn Colors with Spiderman 3D w Trucks Cars Surprise Toys Play Doh for Children” (393 recommendations)
- “Learn Shapes with Police Truck - Rectangle Tyres Assembly - Cartoon Animation for Children” (286)
- “Kinetic Sand Ice Cream Making Learn Fruits with Toys Kinetic Sand Videos for Kids” (230)

Two of the children’s videos in the top 50 were so-called “[surprise egg](#)” toy-opening videos titled “GIANT Lightning McQueen Egg Surprise with 100+ Disney Cars Toys” and “HUGE EGGS Surprise Toys Challenge with Inflatable water slide.”

In some cases, it appears that the titles of these videos may also change over time, suggesting attempts at search optimization that are intended to attract more recommendations or views. For instance, one of the most-recommended children’s videos during the study period was titled “Learn Colors with Spiderman 3D w Trucks Cars Surprise Toys Play Doh for Children.” But following the data collection, that video was renamed to “Learn Colors with Spiderman w King Kong 3D Animals Play Fun Games for Kids | Cartoon for Children.” Although it is not outwardly apparent why this change was made, it may be that the creators were seeking to take advantage of certain popular search terms or elements of the recommendation algorithm that potentially give extra weight to certain subjects.

The final prominent type of video on this list (with seven videos in total) was so-called “life hack” videos. Nearly all these videos were compilations of short, thematically similar snippets and contain little to no human narration. They also highlighted the ways in which certain channels or producers can dominate the recommendation system: All seven were created by and posted to the same branded video channel.

All told, 43 of the 50 videos in this list were in one of the four categories listed above.

These 50 videos were typically already very popular at the time they were first recommended in this analysis, with an average of 456 million views. Forty-eight of them had at least 1 million views on their first encounter, and seven had more than *1 billion* views. At the same time, one video in the top 50 (the children’s video titled “Oddbods Overload | All NEW Episodes | ___LIVE | Funny Cartoons For Kids by Oddbods & Friends”) had just over 34,000 views when it was first recommended.

But regardless of their initial popularity, these videos collectively increased their view counts substantially (by an average of 38.5 million views) between the first and last time they were encountered. Indeed, the children’s video noted above had nearly 30 million views by the final time it was recommended. However, this analysis cannot say conclusively whether this was due to the self-perpetuating nature of the recommendation engine itself, or simply the fact that popular content tended to become more popular over time.

Acknowledgements

This report is a collaborative effort based on the input and analysis of the following individuals. Find related reports online at [pewresearch.org/internet](https://www.pewresearch.org/internet).

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Appendix A: Detailed tables

List of 50 most-recommended videos in this analysis (1 through 25)

Rank	Title	# of recommendations	Video type
1	Bath Song +More Nursery Rhymes & Kids Songs - Cocomelon (ABCKidTV)	615	Kids
2	Maroon 5 - Girls Like You ft. Cardi B	452	Music video
3	Learn Colors with Spiderman 3D w Trucks Cars Surprise Toys Play Doh for Children	393	Kids
4	Luis Fonsi - Despacito ft. Daddy Yankee	359	Music video
5	Ed Sheeran - Perfect (Official Music Video)	340	Music video
6	TOP 250 FUNNIEST FAILS IN FORTNITE	318	Fails
7	33 LIFE HACKS THAT DESERVE A NOBEL PRIZE	295	Life hacks
8	Wheels on the Bus +More Nursery Rhymes & Kids Songs - Cocomelon (ABCKidTV)	292	Kids
9	Learn Shapes with Police Truck - Rectangle Tyres Assembly - Cartoon Animation for Children	286	Kids
10	BEST Magic Show in the world - Genius Rubik's Cube Magician America's Got Talent	282	TV competitions
11	Numb (Official Video) - Linkin Park	263	Music video
12	27 BEAUTY HACKS THAT WILL SAVE YOU THOUSANDS	261	Life hacks
13	Sam Smith - Too Good At Goodbyes (Official Video)	260	Music video
14	ALL 5 GOLDEN BUZZER Britain's Got Talent 2018	258	TV competitions
15	Kylie Jenner Asks Travis Scott 23 Questions GQ	242	Celebrity
16	Top 10 Most UNFORGETTABLE Singing Auditions ALL TIME	240	TV competitions
17	Kinetic Sand Ice Cream Making Learn Fruits with Toys Kinetic Sand Videos for Kids	230	Kids
18	22 TRICKS THAT CAN SAVE YOU TONS OF TIME AND ENERGY	220	Life hacks
19	35 UNBELIEVABLE COOKING HACKS	214	Life hacks
20	Fun Pretend Play Hide and Seek with Johnny Johnny Yes Papa Song for Kids at the Children's Party	209	Kids
21	30 LIFE-CHANGING MAKEUP HACKS EVERY WOMAN SHOULD KNOW	200	Life hacks
22	Oddbods Overload All NEW Episodes __LIVE Funny Cartoons For Kids by Oddbods & Friends	199	Kids
23	Top 10 performance Shocked coaches in The voice Audition 2018	199	TV competitions
24	Animals Can Be Jerks Compilation	199	Animals and pets
25	HUGE EGGS Surprise Toys Challenge with Inflatable water slide	197	Kids

Note: "Video type" determined via categorization by human coders.

Source: Analysis of recommended videos collected via 174,117 five-step "random walks" beginning with videos posted to English-language YouTube channels with at least 250,000 subscribers, performed using the public YouTube API. Results include only those videos recommended by the YouTube algorithm, and not the initial starting videos. Data collection performed July 18-Aug. 29, 2018.

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List of 50 most-recommended videos in this analysis (26 through 50)

Rank	Title	# of recommendations	Video type
26	TOP 10 Magicians Worldwide REAL MAGIC Got Talent Global	191	TV competitions
27	42 HOLY GRAIL HACKS THAT WILL SAVE YOU A FORTUNE	184	Life hacks
28	His Voice Is So Emotional That Even Simon Started To Cry!	183	TV competitions
29	Ed Sheeran - Shape of You [Official Video]	181	Music video
30	THE FLASH: SuperHero Kids Classics Compilation!	178	Kids
31	French Montana - Unforgettable ft. Swae Lee	176	Music video
32	TOP 4 Golden Buzzer America's Got Talent 2017	174	TV competitions
33	Tape Face Auditions & Performances America's Got Talent 2016 Finalist	174	TV competitions
34	Passenger Let Her Go (Official Video)	173	Music video
35	The Most Amazing Moments in Combat Sports EVER!	171	Sports
36	Nothing is IMPOSSIBLE Ep. #2	170	Sports
37	UNBELIEVABLE ! Top 10 Shocking Blind Auditions The Voice 2018	168	TV competitions
38	Sia - Cheap Thrills (Lyric Video) ft. Sean Paul	168	Music video
39	Eminem - Lose Yourself [HD]	167	Music video
40	29 THINGS WE DO WRONG EVERY DAY	167	Life hacks
41	10 Coolest Strongest Toys Which Actually Exist !	166	Inventions
42	The Best Of Eagle Attacks 2018 - Most Amazing Moments Of Wild Animal Fights! Wild Discovery Animals	164	Animals and pets
43	twenty one pilots: Stressed Out [OFFICIAL VIDEO]	164	Music video
44	ALL 5 INCREDIBLE GOLDEN BUZZER America's Got Talent 2018	164	TV competitions
45	Melendi - Destino o Casualidad ft. Ha*Ash	164	Music video
46	"No No" Bedtime Song Cocomelon (ABCKidTV) Nursery Rhymes & Kids Songs	162	Kids
47	GIANT Lightning McQueen Egg Surprise with 100+ Disney Cars Toys	160	Kids
48	W.O.W! ALL 5 GOLDEN BUZZERS on Britain's Got Talent 2018!	155	TV competitions
49	Metallica - Nothing Else Matters [Official Music Video]	152	Music video
50	Coldplay - The Scientist	149	Music video

Note: "Video type" determined via categorization by human coders.

Source: Analysis of recommended videos collected via 174,117 five-step "random walks" beginning with videos posted to English-language YouTube channels with at least 250,000 subscribers, performed using the public YouTube API. Results include only those videos recommended by the YouTube algorithm, and not the initial starting videos. Data collection performed July 18-Aug. 29, 2018.

"Many Turn to YouTube for Children's Content, News, How-To Lessons"

PEW RESEARCH CENTER

Methodology

The American Trends Panel

The American Trends Panel (ATP), created by Pew Research Center, is a nationally representative panel of randomly selected U.S. adults recruited from landline and cellphone random-digit-dial (RDD) surveys. Panelists participate via monthly self-administered web surveys. Panelists who do not have internet access are provided with a tablet and wireless internet connection. The panel is being managed by GfK.

Data in this report are drawn from the panel wave conducted May 29–June 11, 2018, among 4,594 respondents. The margin of sampling error for the full sample of 4,594 respondents is plus or minus 2.4 percentage points.

Members of the American Trends Panel were recruited from several large, national landline and cellphone RDD surveys conducted in English and Spanish. At the end of each survey, respondents were invited to join the panel. The first group of panelists was recruited from the 2014 Political Polarization and Typology Survey, conducted Jan. 23 to March 16, 2014. Of the 10,013 adults interviewed, 9,809 were invited to take part in the panel and a total of 5,338 agreed to participate.³ The second group of panelists was recruited from the 2015 Pew Research Center Survey on Government, conducted Aug. 27 to Oct. 4, 2015. Of the 6,004 adults interviewed, all were invited to join the panel, and 2,976 agreed to participate.⁴ The third group of panelists was recruited from a survey conducted April 25 to June 4, 2017. Of the 5,012 adults interviewed in the survey or pretest, 3,905 were invited to take part in the panel and a total of 1,628 agreed to participate.⁵

The ATP data were weighted in a multistep process that begins with a base weight incorporating the respondents' original survey selection probability and the fact that in 2014 some panelists were subsampled for invitation to the panel. Next, an adjustment was made for the fact that the propensity to join the panel and remain an active panelist varied across different groups in the sample. The final step in the weighting uses an iterative technique that aligns the sample to population benchmarks on a number of dimensions. Gender, age, education, race, Hispanic origin and region parameters come from the U.S. Census Bureau's 2016 American Community Survey.

³ When data collection for the 2014 Political Polarization and Typology Survey began, non-internet users were subsampled at a rate of 25%, but a decision was made shortly thereafter to invite all non-internet users to join. In total, 83% of non-internet users were invited to join the panel.

⁴ Respondents to the 2014 Political Polarization and Typology Survey who indicated that they are internet users but refused to provide an email address were initially permitted to participate in the American Trends Panel by mail, but were no longer permitted to join the panel after Feb. 6, 2014. Internet users from the 2015 Pew Research Center Survey on Government who refused to provide an email address were not permitted to join the panel.

⁵ White, non-Hispanic college graduates were subsampled at a rate of 50%.

The county-level population density parameter (deciles) comes from the 2010 U.S. decennial census. The telephone service benchmark comes from the July-December 2016 National Health Interview Survey and is projected to 2017. The volunteerism benchmark comes from the 2015 Current Population Survey Volunteer Supplement. The party affiliation benchmark is the average of the three most recent Pew Research Center general public telephone surveys. The internet access benchmark comes from the 2017 ATP Panel Refresh Survey. Respondents who did not previously have internet access are treated as not having internet access for weighting purposes. Sampling errors and statistical tests of significance take into account the effect of weighting. Interviews are conducted in both English and Spanish, but the Hispanic sample in the ATP is predominantly native born and English speaking.

The following table shows the unweighted sample sizes and the error attributable to sampling that would be expected at the 95% level of confidence for different groups in the survey:

Group	Unweighted sample size	Plus or minus ...
Total sample	4,594	2.4 percentage points
All YouTube users	3,101	2.9 percentage points
18-29	388	8.2 percentage points
30-49	1,046	5.0 percentage points
50-64	968	5.2 percentage points
65+	697	6.1 percentage points

Sample sizes and sampling errors for other subgroups are available upon request.

In addition to sampling error, one should bear in mind that question wording and practical difficulties in conducting surveys can introduce error or bias into the findings of opinion polls.

The May 2018 wave had a response rate of 84% (4,594 responses among 5,486 individuals in the panel). Taking account of the combined, weighted response rate for the recruitment surveys (10.0%) and attrition from panel members who were removed at their request or for inactivity, the cumulative response rate for the wave is 2.4%⁶.

⁶ Approximately once per year, panelists who have not participated in multiple consecutive waves are removed from the panel. These cases are counted in the denominator of cumulative response rates.

YouTube video analysis

The analysis in this report is based on an examination of “random walks” through the videos recommended to viewers of videos on YouTube channels with at least 250,000 subscribers. Because there is no exhaustive or officially sanctioned list of all videos or video channels (of any size) on YouTube, Pew Research Center developed its own custom list of 915,122 YouTube channels and selected the subset of these channels that had at least 250,000 subscribers. This filtered list included a total of 30,481 high-subscriber channels, and these channels were used as the starting points for the random walks through the recommendation network.

Upon completion of the initial random walks data collection, researchers then trained an algorithm to identify English-speaking channels and filtered the random walks down to those that originated on one of 14,509 channels (or 48% of the original list of 30,481 popular channels) that were determined to use English as their primary language. In total, 174,117 random walks began on one of these channels, and these walks were used as the basis for the analysis in the report.

The development of the custom channel list used in this study, as well as the “random walks” analysis used to study the recommendations made by the YouTube algorithm, are each discussed in more detail below.

Channel list development

The custom list of channels used in this study was developed using an iterative, multistep process. First, researchers used the [YouTube API](#) to develop an initial list of channels comprised of the following:

- The channels associated with the most popular 50 videos at the time in each video category as defined by the YouTube API
- The most popular 100 channels overall
- The most popular channels at the time in each channel category

What are YouTube channels? And why focus on high-subscriber channels?

Much like the profile pages on other social media platforms, YouTube channels function as the owner’s official presence on YouTube and a dedicated homepage for the content the channel owner has posted. Users who are interested in seeing content from a specific “creator” (in other words, a person, company or brand with a presence on YouTube) can subscribe to their channel and automatically see regular updates from them whenever they visit the site.

Researchers chose to examine high-subscriber channels rather than use metrics like a channel’s total video views. This is because subscriber rates are a better measure of a channel’s overall popularity. Channels with high subscriber rates are more likely to regularly produce popular and highly viewed videos, relative to channels with high view counts that could be the product of a single viral video rather than sustained popularity.

Researchers captured the five most-viewed videos from each channel on this initial list, and then captured the top five videos suggested by the YouTube recommendation engine for each of those five most-viewed videos, resulting in 25 video recommendations for each channel. They then collected channel data for each of those 25 videos and repeated the above process once more for any of these channels not on the initial list. Altogether, this process could have identified up to 650 new channels for each channel in the initial list (25 in the first step and 625 in the second).

From the list of channels collected above, researchers used the [YouTube API](#) to conduct random walks through the site in search of new channels. Each random walk would perform the following steps:

- Select a channel from this list at random.
- Upon selecting a channel, randomly select one of the top five videos at the time for that channel as ranked by either relevance, date posted, rating, or view count. The criterion used for each walk was chosen randomly prior to selecting a video.
- Randomly select a new video from the top five recommended videos for that video, as listed in the YouTube API at that point in time.
- Using the recommended video as the new starting point, randomly select a new video from that video's top five recommendations and repeat this step until four recommendations had been followed.
- After five videos had been encountered (the starting video plus four consecutive recommendations), stop the random walk and start a new one.

As the program encountered videos from channels not included in the initial list, those channels would then be added to the list and made available for selection at the start of the next random walk. This process was allowed to run for a period of roughly four months, until few new channels were being identified. In total, researchers conducted 385,187 such random walks through the network over the course of this process, ultimately creating a list of 809,693 channels.

Researchers then once again called the API to select the channels for the top 50 videos in each video category, the top 100 channels overall, and the top channels in each channel category, as was done at the first stage of this process. Researchers also expanded this list of channels with 26,189 additional channels, each with at least 250,000 subscribers, that had been identified in the course of the random walks analysis described above.

For each channel, researchers then repeated the process of identifying the channel's top five most-viewed videos and collecting the top five video recommendations for each of these videos. Channel data were collected for every new channel that appeared in these recommendations, and any new

channel that had at least 250,000 subscribers was added to the ongoing list of channels. Every time the process encountered a video from a channel not in the original list that had at least 250,000 subscribers, that channel would be added and made available for future selection. This entire step was then repeated until no more high-subscriber channels were encountered.

As an additional source of channels that were potentially missing from our initial list, researchers searched the YouTube API for 218 different keywords related to a wide variety of topics and added any channels in the top 50 matches for each keyword (sorted by the API's internal "relevance" measure) if those channels did not already exist in our database. Researchers also compiled a list of top YouTube channels from online analytics company SocialBlade. This list was created on July 13, 2018, and includes SocialBlade's [top 5,000 influential channels](#) and [top 250 YouTubers in the United States](#), as well as their top channels in the following categories: [animals](#), [autos](#), [comedy](#), [education](#), [entertainment](#), [film](#), [games](#), [how to](#), [music](#), [news](#), [nonprofit](#), [people](#), [shows](#), [sports](#), [tech](#) and [travel](#).

Of the overall top 5,000 channels and the top 250 U.S. channels as compiled by SocialBlade, 95% and 96%, respectively, had already been identified in the channel discovery steps we conducted. The channel development had also identified an average of 89% of the channels in the other 16 category lists maintained by SocialBlade. To fill in the remaining gaps, researchers attempted to identify any unique channels found in these SocialBlade lists using the YouTube API, downloaded the channels' subscriber statistics and added to the sample list any newly identified channels with at least 250,000 subscribers. The random walks analysis was then repeated once more, until no new high-subscriber channels could be identified.

Upon completion of the above steps, the channel database now contained a total of 915,122 channels of any size. After removing any channels with fewer than 250,000 subscribers, the mapping process outlined above ultimately identified a total of 30,481 unique channels with at least 250,000 subscribers. This set of 30,481 channels was then used as the basis for the subsequent collection of individual video recommendations (see next section for details).

'Random walks' collection of individual video recommendations

Having defined a list of high-subscriber lists using the process outlined above, researchers then conducted a new random walks analysis to identify individual videos and recommendations within these high-subscriber channels. These random walks also used the YouTube public API and worked in a nearly identical fashion to the ones used to detect new channels during the development of the channel list itself.

First, the process would choose a channel at random from the list of 30,481 starting channels. Next, it would establish a selection criterion at random out of relevance, date posted, user rating or view count and randomly select one of the top five videos in that channel at the time based on that selection criterion. It would then randomly select one of the top five recommended videos listed in the API for that video and repeat that process another three times. At that point, the random walk – consisting of a starting video and four consecutive video recommendations – would be stopped and a new one started.

At each “step” of a given walk, the program would collect a variety of information about the selected video – such as its title, length, number of views, category, date posted or number of comments. The Center conducted 340,244 of these random walks over the period July 18-Aug. 29, 2018.

Filtering to English-speaking channels

As a final step in the analysis after the initial channel selection and random walks process was complete, researchers removed any walks originating from channels for which English was not the primary language. The YouTube API can provide information on the language and country associated with any given channel, but this information is often missing. In order to limit the initial sampling frame to English-speaking YouTube, researchers had to fill in this missing information and identify English-language channels.

Across the entire channel list development and data collection process, researchers collected information on a total of 1,029,859 channels. Of these, 2.6% (26,531) had language information as well as snippet (title/description) and topic tag information. From this subset of channels, researchers drew a sample of 11,874, and then trained an XGBoost classifier to identify English channels using the following features:

- The channel’s country code, if available.
- Binary flags for any topic tags assigned to the channel by the YouTube API.
- Character term frequency-inverse document frequency (TF-IDF) features (60% maximum document frequency, 10 document minimum, 1-5-grams, 15,000 maximum features) based on the title and description of the channel.
- Word TF-IDF features (60% maximum document frequency, 10 document minimum, 1-2-grams, 15,000 maximum features) based on the title and description of the channel.
- Across all random walks in the study that encountered the channel, the proportion of the other channels encountered in those random walks that were flagged for each YouTube language code.

- The probabilities for language predictions based on the “langdetect” Python package, applied to the title and description of the channel.

The classifier was evaluated using 5-fold cross-validation as well as a hold-out sample of 1,188 channels and achieved 90% precision and recall. It was then applied to all channels that had missing language information. Finally, using the new language predictions, the initial set of 340,244 random walks was filtered down to those that started on an English language channel (47% of the initial seed channels were determined to be non-English), resulting in a final total of 174,117 random walks, each of which started from one of 14,509 English language channels. In total, these random walks encountered 696,468 video recommendations to 346,086 unique videos.

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Topline questionnaire

**2018 PEW RESEARCH CENTER'S AMERICAN TRENDS PANEL
WAVE 35 MAY 2018
FINAL TOPLINE
MAY 29 – JUNE 11, 2018
TOTAL N=4,594**

ASK ALL:

SNS Do you use any of the following social media sites? **[RANDOMIZE WITH "OTHER" ALWAYS LAST]**

[Check all that apply]

	<u>Selected</u>	<u>Not Selected</u>	<u>No Answer</u>
ITEMS a-e NOT SHOWN			
h. YouTube			
May 29- Jun 11, 2018 [N=4,594]	68	32	-
Aug 8- Aug 21, 2017 [N=4,971]	58	42	-
Jan 12-Feb 8, 2016 [N=4,654]	48	52	-
Aug 21-Sep 2, 2013 [N=5,173]	51	49	*

ITEMS j-i NOT SHOWN

ASK IF YOUTUBE USER (SNSH=1) [N=3,101]:

YT1 Now thinking specifically about how you use YOUTUBE...

How important to you are videos on YouTube when it comes to... **[RANDOMIZE]**

	<u>Very important</u>	<u>Somewhat important</u>	<u>Not very important</u>	<u>Not important at all</u>	<u>No Answer</u>
a. Understanding things that are happening in the world					
May 29-Jun 11, 2018	19	34	28	18	1
b. Figuring out how to do things you haven't done before					
May 29-Jun 11, 2018	51	35	8	5	1
c. Deciding whether you should buy a particular product or not					
May 29-Jun 11, 2018	19	36	25	20	1
d. Just passing the time					
May 29-Jun 11, 2018	28	40	21	10	1

ASK IF YOUTUBE USER (SNSH=1) [N=3,101]:

YT2 When you watch videos on YouTube, do you also watch the recommended videos that appear alongside the video you are watching?

May 29- Jun 11 <u>2018</u>	
15	Yes, regularly
66	Yes, on occasion
19	No
*	No Answer

ASK IF YOUTUBE USER (SNSH=1) [N=3,101]:

YT3 How often, if ever, do you notice videos on YouTube that... **[RANDOMIZE]**

	<u>Frequently</u>	<u>Sometimes</u>	<u>Hardly ever</u>	<u>Never</u>	<u>No Answer</u>
a. Seem obviously false or untrue May 29-Jun 11, 2018	15	48	23	12	1
b. Are abusive or demeaning towards others May 29-Jun 11, 2018	11	32	37	19	1
c. Show people engaging in dangerous or troubling behaviors May 29-Jun 11, 2018	19	42	25	14	1

ASK IF PARENT OF CHILD AGE 0-11 (KIDS3_1_RF2=1-9 OR KIDS3_2_RF2=1-9) [N=787]:

YT4 How often do you let your child or children age 11 or younger watch videos on YouTube?

May 29- Jun 11 <u>2018</u>	
31	Regularly
43	On occasion
17	Never
8	I do not have any children age 11 or younger
*	No Answer

ASK IF YES TO YT4 (YT4=1,2) [N=599]:

YT5 Has your child ever encountered content on YouTube that you thought was unsuitable for children?

May 29-

Jun 11

2018

61

Yes

37

No

2

No Answer