

# Investigating Facebook’s actions against accounts that repeatedly share misinformation

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## Abstract

### SHORTEN AND ADD NEW CONDOR RESULTS

Like many web platforms, Facebook is under pressure to regulate misinformation. According to the company, users that repeatedly share misinformation (‘repeat offender’) will have their distribution reduced, but little is known about the implementation or the efficiency of this measure. First, combining data from a fact-checking organization and CrowdTangle, we identified a set of public accounts (groups and pages) that have shared misinformation repeatedly. While we observe a decrease in engagement for pages (median of  $-43\%$ ) after they shared two or more ‘false news’, such a reduction is not observed for groups. However, we discover that groups have been affected in a different way with a sudden drop in their average engagement per post that occurred around June 9, 2020. No public information was given by Facebook about this sudden decrease. This drop has cut the groups’ engagement per post in half, but it was compensated by the fact that the overall activity of ‘repeat offender’ has doubled between 2019 and 2020. Second, we identified pages that have been warned by Facebook and have shared a screenshot of the ‘reduced distribution’ notification they have received. We found that their engagement per post following the notification decreased by a modest amount (median of  $-24\%$ ), with some popular pages actually gaining more engagement. Our results highlight easy

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steps Facebook could take to reduce misinformation, such as to enforce their ‘repeat offender’ policy more forcefully on pages, and to start applying it to groups.

*Keywords:* Misinformation, Content moderation, Algorithmic transparency, Facebook, Fact-checking, Social media analysis

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## 1. Introduction

*Research questions.*

- Was the policy aiming to reduce the distribution of misinformation repeat offenders actually enforced by Facebook during the 2019-2020 period?
- 5 • If so, what was the magnitude of the reduction applied? And is there a difference between Facebook groups and Facebook pages?
- Does this action have an impact on the spread of misinformation on Facebook, i.e., can we see a global increase or decrease in engagement for the repeat offender accounts through time?

## 10 2. Investigating the reduce policy on Facebook accounts repeatedly sharing misinformation (Science Feedback data)

To investigate the effect of fact-checking on Facebook accounts that repeatedly share misinformation, we first analyzed the engagement per post received by these accounts. One would expect this metric to decline if the accounts’  
15 posts become less visible in Facebook’s feed.

### 2.1. Methods

We used data from Science Feedback, which is part of Facebook’s third-party fact-checking program [1]. Science Feedback is a fact-checking organization, where academics review the credibility of science-related claims and articles.  
20 We obtained from Science Feedback a list of 4,000+ URLs reviewed by its team. We relied on the 2,452 URLs marked as ‘False’, which we refer to as ‘false news

links’, excluding the URLs marked as ‘Partly False’, ‘Missing Context’, ‘False headlines’ or ‘True’, as well as the URLs marked as ‘False’ but ‘corrected’ by the publisher, because these labels do not contribute to the ‘repeat offender’ status  
25 according to Facebook’s guidelines. The list of ‘false news links’ was obtained on January 4, 2021 and cover links flagged in 2019 and 2020.

Using the ‘/links’ endpoint from the CrowdTangle API, we collected the public Facebook groups and pages that shared at least one false news link between January 1, 2019 and December 31, 2020. Due to the API limitations, if a  
30 URL was shared in more than 1000 posts, we collected only the 1000 posts that received the highest number of interactions [2]. We focused on the accounts that spread misinformation the most often, choosing a threshold of 24 different false news links shared over the past two years.

The corresponding 307 Facebook accounts (289 Facebook groups and 18  
35 Facebook pages) are referred to as ‘repeat offenders accounts’. All the posts they published between January 1, 2019 and December 31, 2020 were collected using the ‘/posts’ endpoint. We calculated the engagement per post by summing the number of comments, shares and reactions (such as ‘like’, ‘love’, ‘favorite’, ‘haha’, ‘wow’, ‘sad’ and ‘angry’ reactions) that each post has received.

40 ‘Repeat offender’ accounts are supposed to have their distribution reduced, according to Facebook’s official communication, but the precise rule Facebook uses to classify an account as ‘repeat offender’ is not specified. However, an undisclosed source obtained by a journalist indicated that:

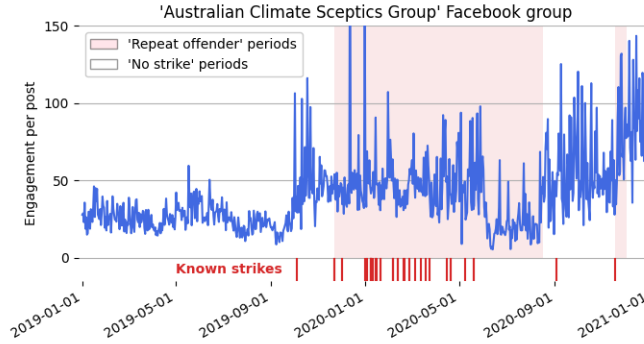
*The company operates on a ‘strike’ basis, meaning a page can post  
45 inaccurate information and receive a one-strike warning before the platform takes action. Two strikes in 90 days places an account into ‘repeat offender’ status. [3]*

Based on this ‘two strikes in 90 days’ rule and the list of strike dates known by Science Feedback, we inferred periods during which each account must have  
50 been under repeat offender status. If a post shares a misinformation link which was previously fact-checked as ‘False’, we used the date of the post as the strike

date. However, if an account shares a link, which later gets fact-checked as  
‘False’, then the fact-check date was used as the strike date. A repeat offender  
period is defined as any given time in which an account shared two or more  
55 ‘false news links’ over the past 90 days (see Figure 1 for an example).

## 2.2. Results

Figure 1 displays the engagement metrics for one ‘repeat offender’ group  
named ‘Australian Climate Sceptics Group’. The known strike dates appear as  
red lines at the bottom and the inferred ‘repeat offender’ periods are shaded in  
60 red. The average engagement per post varies throughout the past two years,  
but does not appear to be related with the shift between ‘repeat offender’ and  
‘no strike’ periods (see Figure 1). We compared the average engagement metrics  
between the ‘repeat offender’ and the ‘no strike’ periods, expecting a decrease  
in engagement during the ‘repeat offender’ periods. However we observe a 61%  
65 increase in engagement.

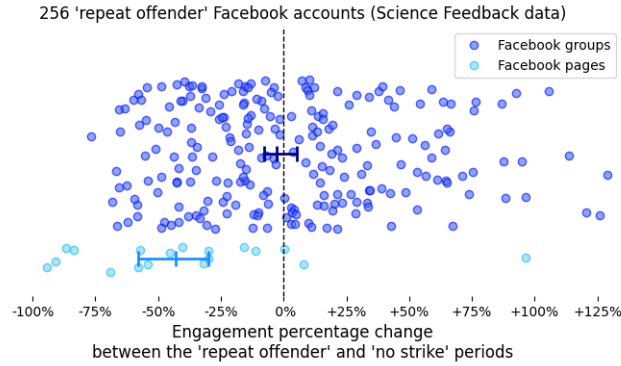


**Figure 1:** Average engagement (the sum of comments, shares, likes, ...) per post for the ‘Australian Climate Sceptics Group’ Facebook group for each day in 2019 and 2020. Each red line at the bottom represents the date of a known strike for this group according to the Science Feedback data. The areas shaded in red represent the ‘repeat offender’ periods as defined by the ‘two strikes in 90 days’ rule.

To provide a general overview, we calculate the percentage change between  
the ‘repeat offender’ and the ‘no strike’ periods for each of the 256 Facebook  
accounts that have published at least one post during each period (see Figure

2).<sup>1</sup> The average percentage change is 7%, and the median  $-6\%$ . A Wilcoxon  
 70 test shows that the values are not significantly different from zero ( $W = 16051$ ,  
 p-value = 0.74).

When we consider groups and pages separately, the percentage changes are  
 different for the two. The median percentage change for Facebook groups is  $-3\%$   
 (not significantly different from zero), while the median for Facebook pages is  
 75  $-43\%$ . A Wilcoxon test applied only to the Facebook pages' percentage changes,  
 shows they are significantly different from zero ( $W = 21$ , p-value = 0.0034).



**Figure 2:** Percentage changes between the average engagement per post during the ‘repeat offender’ periods and the ‘no strike’ periods. Each deep blue dot represents a Facebook group, and each light blue dot a Facebook page. The bars show the medians for each set and their 90% confidence intervals (the intervals are estimated using a bootstrap method). The 256 ‘repeat offender’ accounts represented here were identified by the Science Feedback data, and have published at least one post during each period.

To see whether the strikes would otherwise influence the repeat offenders  
 accounts’ engagement over time, we analyzed the total amount of engagement  
 received by all the posts published by each of the 307 repeat offenders accounts  
 80 for each day of the 2019-2020 period (Figure 3). This metric, representing the  
 total engagement generated by these accounts on Facebook (top panel), can be

<sup>1</sup>The percentage changes were calculated on the periods between January 1, 2019 and June 8, 2020. Because of the drop in engagement described further, the second semester of 2020 was excluded for its vastly diminished and not representative engagement level (see Figure 3).

decomposed as the number of posts published each day (middle panel) times the average number of engagement per post (bottom panel).

The total engagement per day is stable from January to September 2019,  
85 however we observe a rise from September 2019 to June 2020. This rise is explained by the increase in activity of the misinformation accounts (with a doubling of the number of posts per day) while the engagement per post remained rather constant. Around June 9, 2020, the total engagement metrics have massively dropped. This decrease is entirely explained by a corresponding drop in  
90 engagement per post (Figure 3). This drop has cut the groups' engagement per post in half, but it was compensated by the fact that the overall activity of 'repeat offender' has doubled between 2019 and 2020. The engagement for 'repeat offender' groups was thus reset by this intervention to its pre-pandemic level.

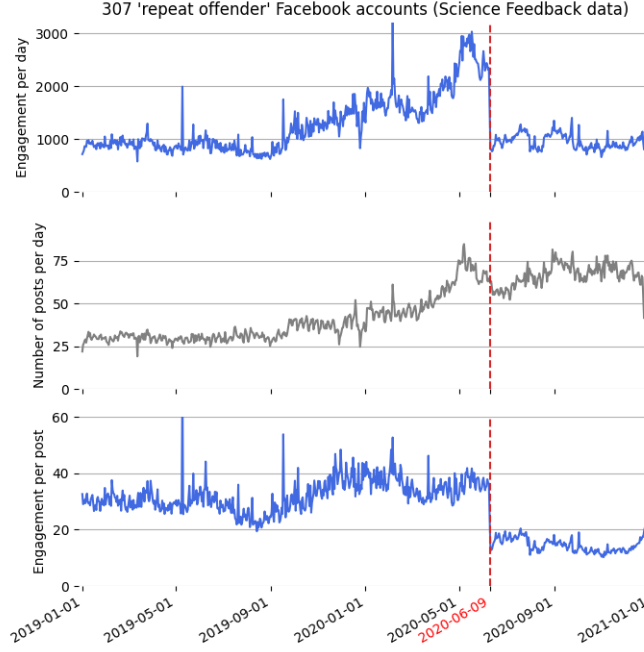
95 To further quantify this 'June drop', we calculated the percentage change in engagement for each account during a 30-day period before and after June 9, 2020 (Figure 4). The average percentage change is  $-21\%$ , and the median  $-43\%$ . Most of the accounts (219 out of 289) experienced a decrease in engagement<sup>2</sup>, and a Wilcoxon test indicates that these percentage changes are significantly  
100 different from zero ( $W = 9012$ ,  $p\text{-value} = 4.6 \times 10^{-17}$ ).

It appears that the Facebook pages are not affected by this decrease, with a median percentage change of  $-5\%$ , while the groups have a median percentage change of  $-45\%$ . When tested separately, the Facebook pages' percentage changes are not significantly different from zero ( $W = 73$ ,  $p\text{-value} = 0.61$ ).

105 To verify whether this drop was specific to this set of groups, we compared these dynamics to those of a control set of accounts consisting of Facebook pages and groups associated with established news outlets that did not publish misinformation. No such drop in total or per post engagement metrics was observed around June 9, 2020.

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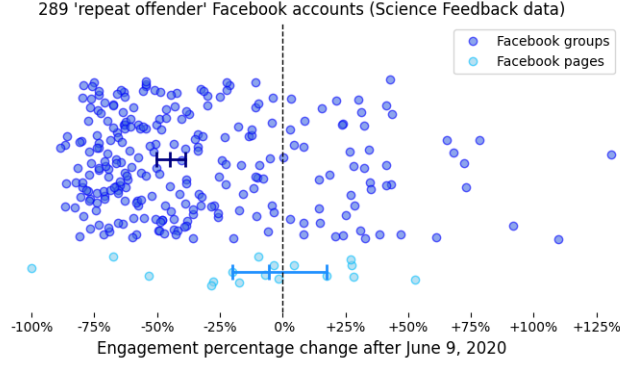
<sup>2</sup>A decrease in engagement on June 9, 2020 can be seen for the 'Australian Climate Sceptics Group' in Figure 1 (the percentage change was  $-60\%$  for this example).



**Figure 3:** (Top panel) Average engagement per day. (Middle panel) Number of posts per day. (Bottom panel) Average engagement per post. The dotted red line marks the date of June 9, 2020, when a sudden drop in engagement is observed. The metrics were aggregated over the 307 ‘repeat offender’ Facebook accounts identified by the Science Feedback data.

110 We can only explain such a massive change by a modification in how Facebook’s algorithm promoted the content from these groups starting on June 9, 2020. While we did observe a relationship between the strike dates and a decrease in engagement for ‘repeat offender’ pages, we observed no such link for ‘repeat offender’ groups. Hence it seems that Facebook only took action against  
 115 these groups via this one-shot measure in June.

One limitation of the results described in this section is that we obtained the links labelled as ‘False’ from only one fact-checking organization (Science Feedback), while Facebook partners with over 60 fact-checking organizations [4]. The true ‘repeat offender’ periods could thus be longer than the ones inferred,  
 120 potentially changing the magnitude of the ‘reduce’ effect.



**Figure 4:** Percentage changes in the average engagement per post during a 30-day period before and after June 9, 2020. Each deep blue dot represents a Facebook group, and each light blue dot a Facebook page. The bars show the medians for each set and their 90% confidence intervals. The 289 ‘repeat offender’ accounts represented here were identified by the Science Feedback data, and have published at least one post one month before and one month after June 9, 2020.

### 3. Investigating the reduce policy on accounts repeatedly sharing misinformation (Condor data)

#### 3.1. Methods

We used data from the Social Science One organization [5], that builds part-  
 125 nerships between academia and private industries such as Facebook to share  
 data and expertise. In July 2021, we had access to a new version of the Condor  
 dataset [6], which contains all URLs shared publicly by at least 100 Facebook  
 users between 2017 and 2021, as well as their fact-checking metadata. From  
 this list, we extracted the 6,811 URLs that were shared in 2019 and 2020, that  
 130 were fact-checked as ‘False’ and whose country in which it was shared most  
 frequently was either the USA, Canada, Great Britain or Australia.

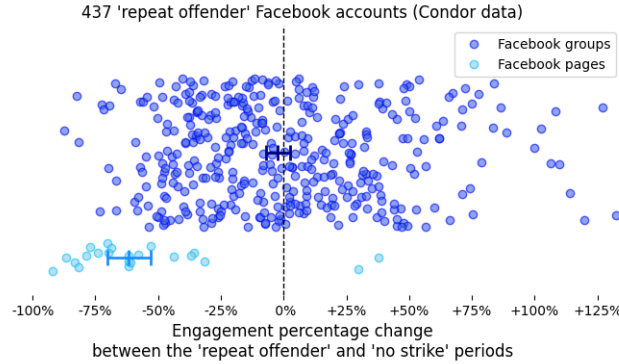
We then replicated as closely as possible the methods used in the previous  
 section. Using CrowdTangle, we thus collected all the posts that shared one of  
 the false links between January 1, 2019 and December 31, 2020, and focused on  
 135 the 706 Facebook accounts (671 Facebook groups and 35 Facebook pages) that  
 spread at least 24 false links. Then we used CrowdTangle again to collect all



the posts published by those accounts in 2019 and 2020. Because the Condor dataset contained the date of the first fact-check done on a URL, we were able to infer the ‘repeat offender’ periods for each account and therefore conduct the same analysis as in the previous section.

Science Feedback being a third-party fact-checker working with Facebook, most of the URLs from Science Feedback were also contained in the Condor dataset (see Supplementary Figure X). Thus an important part of the ‘repeat offender’ groups and pages obtained from the Condor URLs were actually the same as the accounts analyzed previously (see Supplementary Figure X). The point of this new analysis was to replicate the previous results with a more complete URL dataset and for this reason, we excluded the accounts whose engagement was already shown in the previous section. We thus show here the results for 503 ‘novel’ accounts: 476 groups and 27 pages.

### 3.2. Results

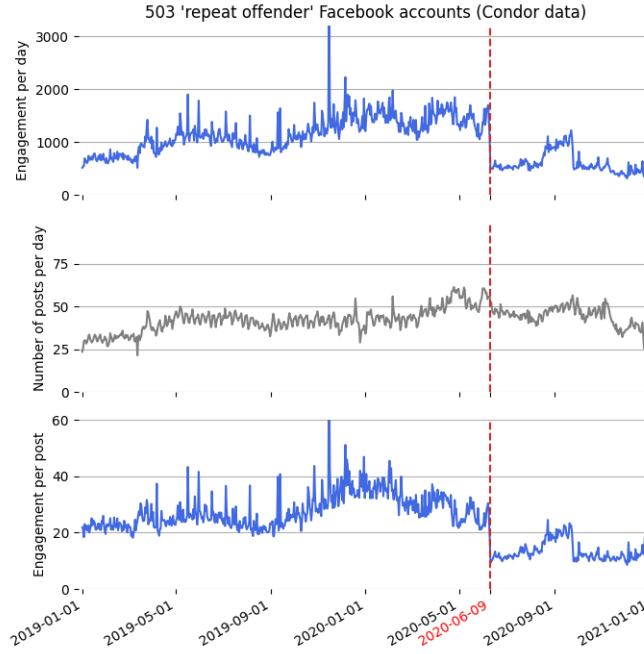


**Figure 5:** Percentage changes between the average engagement per post during the ‘repeat offender’ periods and the ‘no strike’ periods. Each deep blue dot represents a Facebook group, and each light blue dot a Facebook page. The bars show the medians for each set and their 90% confidence intervals. The 437 ‘repeat offender’ accounts represented here were identified by the Condor data, and have published at least one post during each period.

Our first objective is to verify that the repeat offender policy was applied only to Facebook pages, and not to groups during the 2019-2020 period. To

do this, we calculate the percentage change in engagement between the ‘repeat offender’ and the ‘no strike’ periods for each of the 437 Facebook accounts that have published at least one post during each period (see Figure 5). The median percentage change is  $-5\%$ , and the values are not significantly different from zero ( $W = 46495$ ,  $p\text{-value} = 0.61$ ).

The changes in engagement are found to be different for the groups and the pages. The median percentage change for the 414 Facebook groups is  $-2\%$ , while the median for the 23 Facebook pages is  $-62\%$  (Figure 5). A Wilcoxon test applied only to the percentage changes of the Facebook pages shows they are significantly different from zero ( $W = 29$ ,  $p\text{-value} = 0.00041$ ).

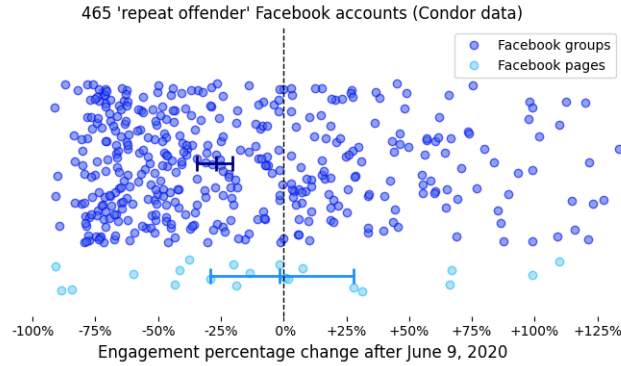


**Figure 6:** (Top panel) Average engagement per day. (Middle panel) Number of posts per day. (Bottom panel) Average engagement per post. The dotted red line marks the date of June 9, 2020, when a sudden drop in engagement is observed. The metrics were aggregated over the 503 ‘repeat offender’ Facebook accounts identified by the Condor data.

As in the previous section, we then analyzed the engagement received by the 503 repeat offenders accounts in 2019 and 2020 (see Figure 6). The ‘novel’

165 accounts replicated the slow rise in total engagement from September 2019 to June 2020, and the massive drop around June 9, 2020. Again, we observe that this measure set the engagement for ‘repeat offenders’ groups back to its early 2019 level.

The percentage change in engagement was then calculated for each account during a 30-day period before and after June 9, 2020 (Figure 7). The median percentage change is  $-26\%$ , and 63% of the accounts experienced a decrease in engagement, the results being a little more modest than what was found previously. The values are still significantly different from zero ( $W = 42651$ ,  $p\text{-value} = 3.8 \times 10^{-5}$ ). The 23 pages have a median percentage change of  $-2\%$  (not significantly different from zero:  $W = 133$ ,  $p\text{-value} = 0.89$ ), while the 442 groups have a median percentage change of  $-27\%$ .



**Figure 7:** Percentage changes in the average engagement per post during a 30-day period before and after June 9, 2020. Each deep blue dot represents a Facebook group, and each light blue dot a Facebook page. The bars show the medians for each set and their 90% confidence intervals. The 465 ‘repeat offender’ accounts represented here were identified by the Condor data, and have published at least one post one month before and one month after June 9, 2020.

To conclude, using a more complete dataset of ‘False’ URLs and collecting new Facebook accounts, we replicated our previous findings. Indeed we again find a sudden decrease in engagement for repeat offender Facebook groups in June 2020, and a decrease in engagement following the publication of two false

links for repeat offender Facebook pages.

One limitation of the results is that this kind of analysis is rather indirect, as we relied on the strike dates to infer the ‘repeat offender’ periods, and we cannot know for certain whether the pages investigated were actually under a  
185 ‘repeat offender’ status. For example, one could imagine that the ‘two strikes in less than 90 days’ rule may have changed over time, or that links fact-checked as ‘partly false’ or ‘missing context’ were also counted as strikes (only links fact-checked as ‘False’ were taken into account in our analysis). In the next section, we used a different methodology to collect pages for which we are sure that they  
190 are under ‘repeat offender’ status.

#### **4. Investigating the reduce policy on pages declaring to be under ‘reduced distribution’**

##### *4.1. Methods*

We noticed that two popular pages (‘Mark Levin’ and ‘100 Percent FED Up’)  
195 have publicly shared a message claiming to be placed under ‘repeat offender’ status with a screenshot as a piece of evidence. To gather a list of such self-declared repeat offenders, we searched on CrowdTangle for posts published since January 1, 2020 with the following keywords:

- ‘reduced distribution’ AND (‘restricted’ OR ‘censored’ OR ‘silenced’)
- 200 • ‘Your page has reduced distribution’

For this we used the ‘/posts/search’ endpoint of the API on November 25, 2020.

We manually opened the resulting posts, and kept the ones which met the following criteria (see Figure 8 top panel for an example):

- The post should include a screenshot of the Facebook notification.
- 205 • In the screenshot, the Facebook notification should say: ‘Your page has reduced distribution and other restrictions because of repeatedly sharing of false news.’

- In the screenshot, the name of the page should be visible.

Doing so, we obtained a list of 94 pages. We found only Facebook pages in  
 210 this case, and no groups. A search using the terms ‘Your group has reduced  
 distribution’ did not yield any result.

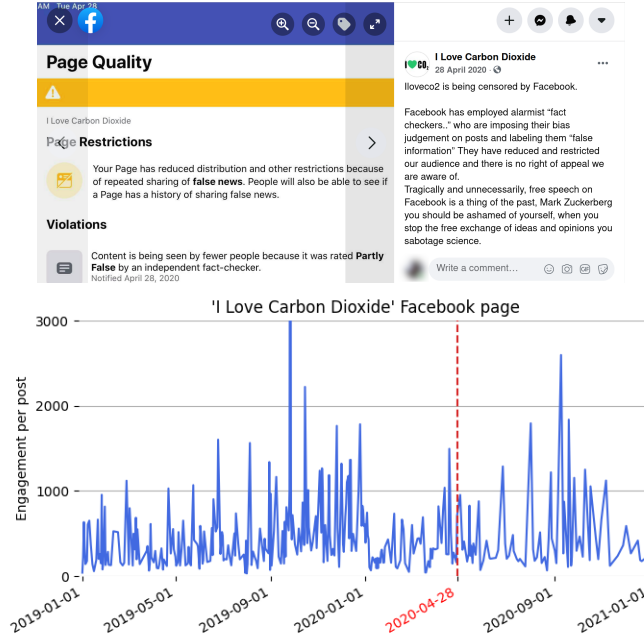
To verify whether Facebook applied any restriction to these pages, we collected all the posts that these 94 pages have published between January 1, 2019 and December 31, 2020 from the CrowdTangle API using the ‘/posts’ endpoint.  
 215 The collection was run on January 11, 2021. We were only able to collect data from 83 of these pages, as 11 were deleted from the CrowdTangle database since our search in November 2020. This highlights an important issue when studying misinformation trends on Facebook: some data disappears as accounts are deleted or changed to ‘private’.

220 The date of the last notification was used as the inferred start date of reduced distribution, when it appeared in the screenshot. When it was not visible, we used the date of the post as the inferred start date of reduced distribution.

#### 4.2. Results

Figure 8 shows a screenshot of the Facebook notification shared by the ‘I  
 225 Love Carbon Dioxide’ page on April 28, 2020, and the average engagement per post of that page over the past two years. The engagement does not appear to be reduced after April 28, 2020. When we compare the engagement during a 30-day period before and after this date, the percentage change is 2%, indicating that the engagement is not affected by the ‘repeat offender’ status.

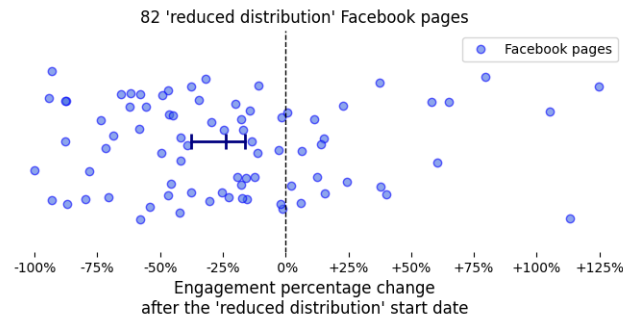
230 To provide a general overview, we calculate the percentage change in engagement during a 30-day period before and after the reduced distribution start date for each of the 82 Facebook pages that published at least one post during each period (see Figure 9). The average percentage change is  $-16\%$ , the median is  $-24\%$ , and a Wilcoxon test reveals that the percentage changes are significantly different from zero ( $W = 911$ ,  $p\text{-value} = 0.00026$ ). We can thus suggest  
 235 that the ‘reduced distribution’ status is associated with a modest decrease in engagement.



**Figure 8: (Top panel)** Screenshot of a post from the ‘I Love Carbon Dioxide’ Facebook page sharing a ‘reduced distribution’ notification from Facebook. **(Bottom panel)** Average engagement per post for the “I Love Carbon Dioxide” page for each day in 2019 and 2020. The dotted red line represents the reduced distribution start date.

However, there is a large heterogeneity across the different Facebook pages. The engagement of some popular pages have actually increased following the notification, such as the ‘Tucker Carlson Tonight’ page with a 38% increase (from 104k to 143k interactions per post).

Finally, we verify whether an important drop in engagement also occurred in June 2020 for this set of Facebook pages. When we compare the engagement metrics before and after June 9, 2020, the percentage changes are not significantly different from zero ( $W = 1093$ ,  $p\text{-value} = 0.055$ ), and the median percentage change is 3%. This confirms that Facebook pages have most likely not been affected by the *reduce* measure implemented on June 9, 2020 and evidenced in the previous sections.



**Figure 9:** Percentage changes in average engagement per post during a 30-day period before and after the reduced distribution start date. Each dot represents a Facebook page. The bars show the median and its 90% confidence interval. The 82 ‘reduced distribution’ pages represented here were identified because they shared a ‘reduced distribution’ notification from Facebook in 2020.

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