

1 **Can scientists fill the science journalism void? Online public engagement with**  
2 **science stories authored by scientists**

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9

## 10 **Abstract**

11 In many countries the public's main source of information about science and technology is the  
12 mass media. Unfortunately, in recent years traditional journalism has experienced a collapse, and  
13 science journalism has been a major casualty. One potential remedy is to encourage scientists to  
14 write for news media about science. On these general news platforms, scientists' stories would  
15 have to compete for attention with other news stories on hard (e.g. politics) and entertaining  
16 (e.g. celebrity news) topics written by professional writers. Do they stand a chance?

17 This study aimed to quantitatively characterize audience interactions as an indicator of interest  
18 in science news stories authored by early career scientists (henceforth 'scientists') trained to  
19 function as science reporters, as compared to news items written by reporters and published in  
20 the same news outlets.

21 To measure users' behavior, we collected data on the number of clicks, likes, comments and  
22 average time spent on page. The sample was composed of 150 science items written by 50  
23 scientists trained to contribute popular science stories in the Davidson Institute of Science  
24 Education reporters' program and published on two major Israeli news websites - *Mako* and *Ynet*  
25 between July 2015 to January 2018. Each science item was paired with another item written by  
26 the website's organic reporter, and published on the same channel as the science story (e.g.,  
27 tourism, health) and the same close time. Overall significant differences were not found in the  
28 public's engagement with the different items. Although, on one website there was a significant  
29 difference on two out of four engagement types, the second website did not have any difference,  
30 e.g., people did not click, like or comment more on items written by organic reporters than on

31 the stories written by scientists. This creates an optimistic starting point for filling the science  
32 news void by scientists as science reporters.

33

## 34 **Rationale**

35 The public draws primarily on the news media in general and internet news sites in particular  
36 for information about science and technology (1–4). Globally, digital media have supplanted  
37 traditional print and broadcast media, which has also affected science journalism (5,6). Today  
38 many science-related news items are written by part-time reporters or reporters specialized in  
39 other fields, who have less background and interest in covering science and technology (7–11).

40 This shortage of specialized personnel has created an opening for the publication of public  
41 relations (PR)-generated content as journalistic content, which sometimes is even printed  
42 verbatim (12–17), thus relinquishing the traditional democratic role of the press as a watchdog  
43 that can signal misconduct, raise ethical questions and make critical observations.

44 A potential remedy for the declining numbers of professional science reporters was suggested  
45 in which scientists address the public directly (18–21). The argument is that by taking part in the  
46 public debate, scientists can contribute to influencing public discourse and policy (22). Visual  
47 scientists could counter fake news and constitute a role model for younger publics (23–25).

48 Correlational studies have shown that scientists who engage with the public also perform  
49 better academically (26,27). Web 2.0 provides scientists with platforms to directly disseminate  
50 their scientific messages, and allows broad audiences to comment, react, and potentially  
51 engage in dialogue with scientists (2,6,28,29). However, a closer examination of the audiences  
52 who interact with science on social media and dedicated blogs shows that they remain largely

53 within the circles of academics and science enthusiasts (30,31). Hence, although social media  
54 platforms can increase the public's exposure to science, the news media still wields  
55 distributional power that could be harnessed by scientists as a platform to present their ideas  
56 to wider audiences.

57 As noted in an editorial in 'Nature' in 2009: "An average citizen is unlikely to search the web for  
58 the Higgs boson or the proteasome if he or she doesn't hear about it first on, say, a cable news  
59 channel. And as mass media sheds its scientific expertise, science's mass-market presence will  
60 become harder to maintain"(19). Currently, scientists seldom have direct access to general  
61 news outlets. In addition, whereas scientists may be conversant in recent innovations and  
62 scientific breakthroughs, they are not skilled in writing in an engaging fashion for the public,  
63 particularly compared to media reporters.

64  
65 Online news media adhere to different norms, agendas and styles than those found in the  
66 academic writing that scientists are accustomed to producing. The online news media compete  
67 for the public's attention on a very tight schedule, that only allows a very short time for research,  
68 fact checking and the writing needed for science reporting, thus forcing journalists to operate  
69 under a heavy workload (15,32). While scientists write mostly for their peers to share, promote  
70 and advance scientific research, reporters aim to inform, alert and encourage public debate on  
71 topics that are thought to be on the public agenda or even purely entertaining (33–35). Whereas  
72 scientists are trained to write to other experts using a traditional, well accepted format of the  
73 IMRAD structure (Introduction, Methods, Results and Discussion) (20,36–38) and use scientific

74 jargon abundantly, journalists use different genres and vocabulary to address non-expert  
75 audiences (20,36–40).

76 News sites are a competitive environment where scientists' stories compete for attention with  
77 other news stories on hard (e.g. politics) and soft (e.g. celebrity news) topics (41) written by  
78 professional writers. Do they stand a chance? This study was designed to quantitatively  
79 characterize audience interactions with science news stories as an indicator of interest and  
80 attention. These stories, authored by early career scientists (henceforth 'scientists') trained to  
81 function as science reporters were compared to audience reactions to news items written by  
82 reporters and published in the same news outlets.

83

## 84 Methodology

### 85 Research context

86 The Davidson Institute, – the Educational Arm of the Weizmann Institute of Science in Israel has  
87 trained and employed graduate students, postdocs and research fellows in the sciences as writers  
88 for its website since 2006. In early 2014, an academic conference panel about science and risk  
89 communication in the online Israeli media<sup>1</sup> (The 6<sup>th</sup> Israeli Science Communication Conference, (2015)  
90 Davidson Institute of Science Education, Weizmann Institute of Science, Rehovot (June 24-25)) hosted the editor  
91 in chief of the *Mako*<sup>2</sup> ([www.mako.co.il](http://www.mako.co.il)) news website. As a result of that meeting the Davidson  
92 Institute began collaborating with *Mako* by publishing science items written by scientists involved  
93 on its website (42). *Mako* is the third most visited Israeli News site (23.2M entries in the last  
94 quarter of 2016, (43)), which is owned and operated by 'Keshet', Israel's largest TV commercial  
95 broadcasting company. It offers news content alongside streaming of TV shows. This type of

96 collaboration was then also extended to *Ynet*<sup>3</sup>([www.ynet.co.il](http://www.ynet.co.il)), Israel's most widely read news  
97 website (52.5M entries in the last quarter of 2016, (43)). *Ynet* is operated by the 'Yediot  
98 Aharonot' media group that publishes a daily tabloid newspaper in addition to the website and  
99 caters mostly to young audiences (aged 18-34) surfing on mobile devices (43). Both news sites  
100 provide freely available news content. The two websites do not employ a dedicated science  
101 journalist, or require the reporters covering these topics to have background in science.

102 Currently, the Davidson reporters program employs about 50 graduate science students and  
103 faculty who attend an annual brief training program led by the editorial team that focuses on  
104 practical methods to improve popular writing (e.g., avoiding jargon and passive voice). The  
105 writing process is mostly based on individual contacts between the scientists and the in-house  
106 editor. The Davidson editorial team is composed of science editors, two content editors and an  
107 editor in chief who is a former journalist. All the editors, except one content editor, have  
108 academic science degrees. In cases where the content editors have reservations about the  
109 content, they consult the scientist who authored the item before sending it for a final revision by  
110 the editor in chief. The scientists have backgrounds in different fields and are at various stages of  
111 their graduate degrees, although a few are already faculty members. There is no quota  
112 demanded of each writer, but most scientists write between one to four 500-word items a  
113 month. The topics span the science, technology, mathematics and engineering (STEM) fields, and  
114 are chosen by the editorial team as a function of their newsworthiness and potential for public  
115 interest (or based on topics suggested by the scientists). The scientists are not allowed to write  
116 about their own research or research done in their labs, but are encouraged to write about local

117 Israeli research as part of the Davidson agenda. The scientists are employed on an hourly basis  
118 to promote thorough inquiry (rather than being paid on the basis of number of words).

119 The Davidson Institute initially proposed this collaboration with the *Mako* and *Ynet* news site  
120 editors to increase the quantity and quality of science content in the news. According to  
121 Davidson staff, this collaboration enables scientists to share accurate, innovative scientific  
122 information and make it part of public's everyday news consumption while the news sites  
123 benefit from free high-quality science content. To date, this arrangement involves most of the  
124 mainstream news sites operating in Hebrew in Israel. The news site editors are provided with  
125 edited text, which they are not allowed to alter without Davidson's permission, but they are  
126 free to change the headlines.(For a critical analysis see also (42)). The name of the scientist  
127 appears in the credit line, and is visible to the readers even before clicking the item to read, and  
128 includes the person's title and affiliation to the Davidson Institute. The name of the writer, his  
129 or her affiliation and status is also stated at the end of the item (e.g. "Yael Groper, Davidson  
130 Institute of Science Education website reporter and a doctoral student in the Weizmann  
131 Institute of Science") alongside a link to the research article, if the item is based on one.

132 **Researcher positioning:** The first and third authors are university-based science communication  
133 researchers not affiliated with either Davidson, *Mako* or *Ynet*. The second author is the head of  
134 the science communication unit in the Davidson Institute and the initiator of the scientist  
135 writing program and collaboration with the news sites.

136

137 **Data source and sampling**

138 Digital media and Web 2.0 allow access to accurate and updated data on consumers'  
139 engagement with content (44,45), and sometimes even influence editorial decisions on topics  
140 and item placement (46–48). Previous studies have pointed to the disparity between what  
141 journalists think interests the public and readers' choices, mainly as regards the emphasis on  
142 public affairs issues (49). Studies of public engagement with science content online have mainly  
143 focused on views (clicks) and comments. They have analyzed engagement in terms of different  
144 forms of interactivity offered by the online platforms (e.g. clicking, commenting, emailing, etc.)  
145 that varies between topics and is time and context sensitive (44,50–54).  
146 Although engagement data are used routinely in online newsroom decision making, little is  
147 known about the characteristics of public interactions with online science items (55). This is due  
148 primarily to the difficulty of obtaining data (e.g., number of clicks and average time on page)  
149 which are kept confidential for commercial reasons.  
150 As part of this research-practice collaboration, the researchers were given access to  
151 confidential Google Analytics data, including clicks, time spent on the page, likes and comments  
152 on *Mako's* and *Ynet's* websites. Due to the commercial sensitivity of the information, data  
153 mining took place on several consecutive days at the news company offices at *Mako*. The  
154 researcher was not allowed access to the information directly from *Ynet* but was sent the  
155 requested data electronically. Data were kept on an encrypted drive with access restricted to  
156 the first author alone. Due to the commercial nature of the data, the researchers were  
157 committed not to disclose the raw data. Hence, here, only descriptive data such as averages  
158 and standard deviation are presented.



159 The initial dataset was composed of all 296 news items written by scientists and published on the  
 160 two websites from July 2015 to January 2018 (Table 1). These were published mainly on the  
 161 Digital, Health, Animals, Culture and Traveling channels (ranked by the number of items in each  
 162 section).

163 **Table 1. Data collection.**

Year	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2015							3	2	1	6	6	7
2016	6 1	4 1	10 4	6 2	3 2	4 4	4 9	6 10	0 0	0	8 13	5 15
2017	2 14	2 11	5 15	7 13	5 18	4 14	4 16	4 10	7	0	1	1
2018	1											

164  
 165 Data were collected in March 2016 and January 2018. Dark grey shading indicates months when  
 166 scientists' items were published on the *Mako* website (n = 114) and in light grey for *Ynet* (n =  
 167 182). The matching process yielded a total of 150 pairs of news items. Items that did not have a  
 168 corresponding item written by reporters (n=57) and items without access to the full  
 169 engagement data (n=89) were omitted.

170  
 171 **Database of matching items**  
 172 Each science item written by a scientist was paired with a corresponding news item written by a  
 173 professional reporter that was published on the same channel and within an average of 0.8 days  
 174 apart (about half of the items were published on the same day, and the rest no more than three

175 days before or after); see Figure 1 for an example of paired items. After this initial filtering by  
176 channel and date of publication, we made efforts to pair similar formats (e.g. quizzes, video  
177 articles, short/long items, etc.) when there was a choice of several organic items. In cases where  
178 no corresponding item was found on the same channel and within the designated timeframe, the  
179 reference item was excluded from the database (n = 57). Due to restricted access of the  
180 researcher to the *Ynet* news site's data and to broken links in both news sites, another 89 pairs  
181 were omitted from the sample. Overall, the process yielded a total of 150 pairs of news items,  
182 51% of the initial dataset. The final database is a representative sample of the full database  
183 consisting of all channels and within the same time range as the full database.

184 On *Mako* website, 69% of items written by scientists were published on the Health channel,  
185 alongside site reporters' items on new treatments and diet suggestions (e.g. "Five delicious  
186 recipes for a healthy meal", 21/8/2017). Another 12% of the scientists' generated items were  
187 published on the Holiday/Travel channel and paired with items on new popular vacation resorts,  
188 celebrities' vacations and other travel information (e.g. "Where do the residents of the "Big  
189 Brother" reality show love to go on vacation?", 1/1/2016). An additional 7% were published on  
190 the HIX magazine devoted to "Scientific discoveries, interesting phenomena, funny inventions,  
191 exciting news and other events from the world", and on the Culture channel.

192 On *Ynet* website, the vast majority of items (97%) were published on the Digital channel,  
193 alongside items such as "After a mouse and a gorilla: was a shark photographed on Mars?"  
194 (27/3/2016). The remaining 3% were published on the Animals, Health and World channels.  
195 While the scientists' items were always about a scientific study, or science related issues, the

196 paired organic items were more diverse in terms of topics. Although the paired items had a  
197 similar topic, since they were published on the same channel, an organic item on the Digital  
198 channel on *Ynet* for example, could be a set of pictures showing readers what the Earth looks like  
199 at night, without any scientific or research related content. In four rare occasions both paired  
200 items covered the same exact topic side by side (one on *Mako* and 3 on *Ynet*, see Table 2 for item  
201 headlines). About half of the pairs in the database were both scientist and organic reporter items,  
202 on a scientific or research related topic. Since we could not pool the paired items from the two  
203 websites, there are too few items from each site to calculate statistical significance.

204 *[Insert Figure 1 about here]*

205 **Figure 1. Screenshot of paired items from the *Mako* website to illustrate the matching process.**

206 The item on the left, written by a scientist is titled “How can we have Wi-Fi on an airplane? And  
207 how does it work?”(written by Carmel Shor), whereas the item on the right was written by the  
208 website’s reporter and was titled “In the near future: airplane toilets that clean themselves”  
209 (written by the vacation channel editorial). Both items were published on the same day and on  
210 the same website channel (“Vacation”).

211 **Table 2. Headlines of paired items on the same topics.**

Website	Scientist's item headline	Reporter's item headline
<i>Ynet</i>	“Seeing through Jupiter’s clouds” (4/7/2016)	“After a 5-year journey: Juno will reach Jupiter this week” (3/7/2016)

	“An Earth-like planet was discovered 4 light years away” (24/8/2016)	“Has a planet similar to Earth been found?” (24/8/2016)
	“A solar system with 7 Earth-like planets was discovered” (22/2/2017)	“Seven planets right next to each other: “Not much chance for life”” (22/2/2017)
<i>Mako</i>	“The HPV vaccination is perfectly safe” (21/10/2016)	““The vaccination doesn’t cause paralysis that same day”” (20/10/2016)

212

213 Four rare occasions in which an item on the same topic was published written by the website’s  
 214 organic reporter and also by a scientist from the reporters’ program. Items addressed the same  
 215 topics and were published more or less at the same time. These items differed in terms of the  
 216 frames and angles the writers chose to take. Public engagement was higher with the items  
 217 written by reporters on the first and last items, whereas the opposite was found for the two  
 218 others.

219

## 220 **Data analysis and engagement types**

221 Four quantitative parameters were chosen as indicators of audience engagement based on  
 222 previous studies (43–45,51–55) and the available data. The data used in this study relied solely  
 223 on absolute numbers for each parameter. Other relevant variables, such as an item’s location  
 224 on the website, length of time visible on the channel, length of the item etc., were not  
 225 available. **Clicks** (*views*) were used as an indicator of interest in reading the item based on the  
 226 headline. When presented on the entry page, a secondary sub-headline was visible to readers  
 227 as well. The number of clicks ranged widely from a low of 651 to a high of 269,802 clicks on the

228 most popular item “How does Bitcoin work?” (*Ynet*, Dec. 2017) (for average clicks per site see  
229 Table 3).

230 **Average Time on page** (reported in seconds) represents the time devoted by readers to each  
231 item. This indicator can provide some indications as to whether the item was read in full. The  
232 average time spent on page ranged from 13 seconds to 1,702 seconds for the item “The God  
233 Pan and nude festivals in the Golan heights 1900 years ago” written by the website’s reporter  
234 (*Mako*, June 2016) (for averages per site see Table 3).

235 **Likes** can represent readers' favorable opinion of the item or the event it describes. It demands  
236 a higher engagement level on the part of the reader since by clicking ‘Like’ (in the *Mako*  
237 website, the ‘Like’ option is marked as ‘Recommend’), the item is published on the reader's wall  
238 on Facebook, thus exposing it publicly. At the time of data collection *Facebook* was the only  
239 social media platform with an available interface with the two news sites. Likes ranged from  
240 zero to 3,600 for the most popular item “An Earth-like planet was discovered 4 light years  
241 away” (*Ynet*, August 2016) (for averages per site see Table 3).

242 **Comments** require more time and effort relative to 'Likes'. Comments could be one word long  
243 to several paragraphs long, and may be off topic. Any internet user can post a comment  
244 anonymously on these two websites. The number of comments ranged from no comments at  
245 all to 621 comments on the most popular item “The physics of building pyramids” (*Ynet*, April  
246 2017) (for averages per site see Table 3).

247 **Table 3. Comparison of reader engagement with items by scientists and reporters.**

		Clicks (views) Mean $\pm$ SD	Time on page <sup>a</sup> (in sec.) Mean $\pm$ SD	Likes <sup>b</sup> Mean $\pm$ SD	Comments <sup>c</sup> Mean $\pm$ SD
Mako	Organic	21338.2 $\pm$	154.1 $\pm$ 89.3	229.8 $\pm$ 521.6	9.3 $\pm$ 10.2
	reporters	28412.9 (n=89)	(n=92)	(n=85)	(n=89)
	Scientists	12469 $\pm$ 13217.9 (n=89)	147 $\pm$ 92.5 (n=92)	124 $\pm$ 272.1 (n=85)	6.6 $\pm$ 9.3 (n=89)
Statistic		Z = -2.862 p < 0.01	n.s	n.s	t(81)=3.1 p < 0.01
Ynet	Organic	43803.9 $\pm$	1046.1, $\pm$ 442.4	74.8, $\pm$ 72.8	60.8, $\pm$ 88.6
	reporters	47778.6 (n=59)	(n=53)	(n=32)	(n=150)
	Scientists	37764.6 $\pm$	1052.0, $\pm$ 510.6	78.8, $\pm$ 90.8	59.4, $\pm$ 63.6
		32275.9 (n=59)	(n=53)	(n=32)	(n=150)
Statistic		n.s	n.s	n.s	n.s

248

249 All non-significant cells appear in dark grey. Significant cells appear in light grey. P-values were  
 250 calculated for paired t-tests and the t-statistic is reported. The Z score and the p-value are  
 251 shown for non-parametric Wilcoxon signed-ranks tests.

252 <sup>a</sup> The considerable difference in average time spent on page between the two websites might result  
 253 from differences in 'Google Analytics' preferences, settings or the use of the two companies, but this  
 254 information was not disclosed, see also research limitations.

255 <sup>b</sup> The Likes category refers to the absolute number of likes each item received in both data  
 256 collecting periods on the *Mako* website (n=85). In contrast, the Likes category for the *Ynet*  
 257 website refers only to the first round of data collection (n=32), since during the time between

258 the two data collecting rounds the website canceled the option. Hence, for this category the  
259 number of *Ynet*'s paired items is low.  
260 <sup>c</sup> Number of comments was recorded from the site itself, resulting in a different number of  
261 paired items for this category on the *Ynet* news site (n=150). The number reflects the number  
262 of published comments, rather than the number of submitted comments (some comments are  
263 removed by the site editors).

264

## 265 **Statistical analysis**

266 Each engagement type was assessed for normal distribution. A paired sample t-test was used  
267 for normally distributing parameters, such as average time on page on both websites and  
268 comments on *Mako* and Likes on *Ynet*. A Wilcoxon signed-rank test was used for parameters  
269 that were not normally distributed, such as Clicks on both websites and Likes on *Mako* and  
270 comments on *Ynet* ( $\alpha=0.05$ ). In order to verify that the time difference between the two  
271 sampling cycles did not affect the data, a one-way ANOVA was run on the first and last two  
272 months and the median date of the data collection cycles for each parameter. No significant  
273 difference was found. Therefore, the results of the statistical analyses are presented for the  
274 two rounds of data collection combined.

## 275 **Results**

276 In this study we are in the unique position where non-significant differences between groups  
277 are highly informative for the goals of the study. Figure 2 presents the comparison of all  
278 engagement types on both websites.

279 In the case of the *Mako* website no significant differences were found between items written  
280 by scientists and *Mako's* organic reporters for average time on page and 'Likes', based on 92  
281 and 85 pairs of items, respectively (Table 3). On the other hand, a Wilcoxon signed-ranks test  
282 showed a statistically significant difference in the number of Clicks (views) between items  
283 written by scientists and organic reporters ( $n=89$ ,  $Z = -2.862$ ,  $p = 0.004$ ) and a paired sample t-  
284 test showed a statistically significant difference in the number of Comments ( $n= 89$ ,  $p<0.05$ )  
285 with more public engagement in response to *Mako's* organic reporters on both parameters. To  
286 conclude *Mako's* results, there was no difference in the time devoted to reading the items or  
287 liking them (hitting the 'Like' button) but there was a clear preference to click items that were  
288 not written by scientists and were not necessarily about science.

289 While *Mako's* results were mixed, on the *Ynet* news site an analysis of the data retrieved on the  
290 paired items showed no significant differences between items written by scientists and organic  
291 reporters on any of the parameters (Table 3). For example, the average length of time on page  
292 for items written by organic reporters was 17:26 minutes, whereas the time on page for an  
293 item written by scientists had a viewing duration of 17:32 minutes, on average, as shown in  
294 Figure 1. Thus, based on our data, the public's interactions with science news written by  
295 scientists were not significantly different from other news items written by reporters on *Ynet's*  
296 news site.

297 *[Insert Figure 2 about here]*

298 **Figure 2. Number of views, average time on page, likes and comments in items authored by**  
299 **reporters and items written by trained scientists.** Top row portrays data from the *Ynet* news  
300 site, lower row shows data from the *Mako* news site. Column a. distribution of number of Clicks  
301 on items (*Ynet*  $n=59$  pairs, *Mako*  $n=89$  pairs); column b. distribution of average time spent on



302 page (in sec.) (*Ynet* n=53 pairs, *Mako* n=92 pairs); c. distribution of the number of likes received  
303 (*Ynet* n=32 pairs, *Mako* n=85 pairs); column d. distribution of the number of comments on  
304 items written by reporters vs. trained scientists (*Ynet* n=150 pairs, *Mako* n=89 pairs).

305

## 306 Discussion

307 Americans' and Israelis' primary information source about science and technology is the online  
308 news medium (4,56), which is impacting public attitudes, perceptions and even behavior (1,57–  
309 61). News media has the potential to promote scientific understanding, especially if sufficient  
310 explanations of the science are provided and a narrative is used for its presentation (57).  
311 Hence, accurate, accessible and relevant science stories in the news media are important  
312 factors in a healthy science communication environment. Unfortunately, given the current  
313 collapse of traditional journalism worldwide, science journalism has become a major casualty,  
314 thus hindering its ability to provide quality science coverage. For example, between 2013 and  
315 2015, the number of science reporters in the Israeli news media decreased from 9 to only  
316 three, a drop that continues to this day (62). The results of this study suggest that filling the  
317 void created by the firing of titular science reporters by scientists who write for the media may  
318 be a viable solution resulting in a higher frequency of scientific content in the news media  
319 which is also attractive to readers.

320 This study examined whether readers reacted differently to science news items written by  
321 scientists as compared to news items written by organic reporters published on the same  
322 online news media sites. Generally speaking, based on our findings, the answer is no: audiences  
323 interacted similarly with both. This finding justifies the time and effort invested by the scientists  
324 and the Davidson science communication team to write attractive science stories, and justifies

325 the resources provided by the news sites. Apparently if websites publish it, audiences will  
326 consume it. The website gains highly credible, reliable, science items free of charge and the  
327 scientists get a spot in a high exposure platform (63).

328 These optimistic results raise a normative question about the impact of these collaborations on  
329 science journalism and science communication. In a democratic society the media do not only  
330 serve as an information conduit for the public (64), but also as platform to critique the  
331 authorities as regards misconduct, corruption or misuse of public resources (17,64). Scientists  
332 communicating science while working as scientists can fill the informing and popularizing void,  
333 but cannot take on the watchdog role since they cannot be expected to provide a critical  
334 independent outsider approach of journalists. Providing ready-made scientific content to news  
335 outlets without charge may perpetuate the media's reliance on free, external content, and  
336 hence contribute to the weakening position of science journalists. It could be argued that  
337 accustoming the media to getting ready-made content without journalistic scrutiny may in fact  
338 be advancing 'churnalism'- a practice in which pre-packaged stories provided by news agencies  
339 and press releases are adapted for publication instead of reported news, and therefore  
340 potentially posing a danger to the legitimacy of science journalism and undermining its  
341 credibility (12,13,65).

342 While these are important caveats, it is crucial to note that although the Israeli online news  
343 media form one of the most accessible sources of information about science and technology  
344 related topics, they are also ranked as mostly unreliable (an average of 5.6 on a 10-point scale).  
345 University scientists, on the other hand, are seen as the most reliable source of information (an  
346 average of 7.6 on a 10-point scale), but inaccessible (only 19% of the survey respondents

347 mentioned them as their sources of information about science and technology) (66). The model  
348 described here integrates the strengths of each source; i.e., exposure and accessibility on online  
349 media and the reliability and expertise of university scientists.

350

351 The results from the two sites were mixed. No significant differences were found between  
352 scientists' and reporters' items on *Ynet*, but mixed findings were found on *Mako*, where  
353 reporters' items had more views and comments, but likes and time on page did not differ. The  
354 differences between the results from the two news sites may be attributed to their  
355 characteristics: *Mako* is owned by 'Keshet', Israel's largest commercial TV broadcasting  
356 company and shares the same website ([www.mako.co.il](http://www.mako.co.il)) with television content on demand.  
357 *Ynet* is operated by the 'Yediot Aharonot' media group that also publishes a daily newspaper.  
358 This may suggest differences in the expectations and motivations of audiences reading the two  
359 websites. Although both websites offer news coverage on an array of topics, most visitors to  
360 the *Mako* website expect more entertaining options than when accessing *Ynet* for more hard  
361 news content. Given these differences in press orientation, our assumption is that more *Mako*  
362 readers accessed the website with light entertainment in mind, rather than an interest in  
363 finding out about recent scientific or technological developments. Another explanation is  
364 related to the structure of the websites. While *Ynet* has a designated channel for science in  
365 which the majority of the items in the database were published (97% of the items on *Ynet*, 39%  
366 of the total database), *Mako* does not publish this type of channel, and all the items from the  
367 database were published in the different channels the website offers its audience.

368 This study was enabled by a Research-Practice-Partnership (RPP). This unique position allowed  
369 the researchers access to data that are usually unavailable for commercial reasons, while  
370 providing practitioners with an evidence-based evaluation of their science communication efforts  
371 and the public's interaction with their products. Such RPPs have immense potential for improving  
372 practice and tapping experience-based questions and real-life data. More of these collaborations  
373 will increase reliance on behavioral data that can complement self-report research instruments.

374 **Research Limitations.** One of the key limitations of this study was its reliance on the *Google*  
375 *Analytics* data mining system. The algorithm used to collect data by *Google* is unknown, and so  
376 are the basic assumptions underlying its data mining algorithm. Hence this study relied solely on  
377 absolute data for the number of clicks (views), Likes, etc. We did not use other information  
378 provided by *Google Analytics* such as age and gender since these constitute inferable data that  
379 rely on *Google's* search and deduction algorithm.

380 Our data show a significant difference in average time spent on page between the two  
381 websites. This could also be a result of the settings, preferences and specifications each news  
382 company used to configure the data collection. These were not disclosed either. This problem  
383 was mitigated by not comparing public engagement between the two websites, only between  
384 writers on the same website.

385

386 Finally, it is important to emphasize that this study focused on the quantity and type of audience  
387 interactions with two types of coverage. The quality of the coverage and user generated content  
388 was not addressed. For example, comments might only contain a title with no additional text, or

389 be several paragraphs long. Comments could be positive or critical (e.g., ‘interesting but it was  
390 hard to understand’) or off topic. The quality of these aspects might defer between the types of  
391 coverage and their associated reader comments.

## 392 Conclusion

393 This study examined the public's interactions with scientists’ popular writing, thus shedding  
394 light on online public engagement with science outside of an experimental setting. The results  
395 paint a positive picture where in most cases no differences were found between the ways  
396 audiences responded to scientific reports written by scientists-as-science-reporters, and stories  
397 written by news site reporters. This model may thus provide a practical solution for filling the  
398 science journalism void on struggling news media.

## 399 Acknowledgments

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576 **Tables and figures**

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ערוץ האח  
הגדול live:  
שידור חי  
מהבית לצפייה



706K  
Like

חופש **mako**  
מבית קשת



ערוץ האח  
הגדול live:  
שידור חי  
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706K  
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חופש **mako**  
מבית קשת

ראשי חדשות סלבס makoTV האח הגדול תכניות Ts מיוחדים

ראשי-חופש | חדשות ואירועים | בארץ | בעולם | מדריכי יעדים בעולם | המדריך לחופשה | טיפים ל

Like 25 4 7,309



## שאלות באוויר

### איך זה שיש וויי-פיי במטוס? ואיך הוא עובד?

עידן הניתוק מאינטרנט בשחקים מסתיים והולך, ובקרוב תהיה לנו גישה לרשת אלחוטית כמעט בכל טיסה. איך הדבר הזה עובד, ולמה זה לקח כל כך הרבה זמן?

כרמל שור | מכון דוידסון, הזרוע החינוכית של מכון ויצמן למדע | פורסם 06/03/16 08:32

ראשי חדשות סלבס makoTV האח הגדול תכניות Ts מיוחדים

ראשי-חופש | חדשות ואירועים | בארץ | בעולם | מדריכי יעדים בעולם | המדריך לחופשה | טיפים ל

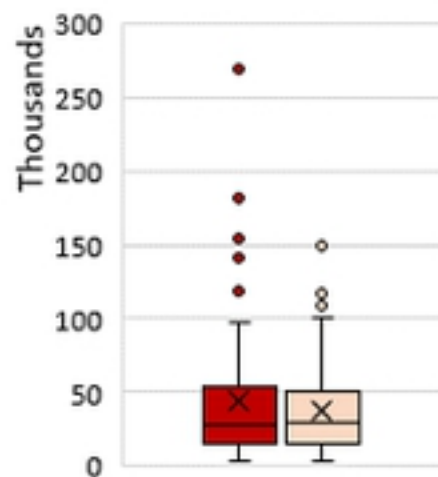
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## בעתיד הקרוב: שירותי מטוס שמנקים את עצמם

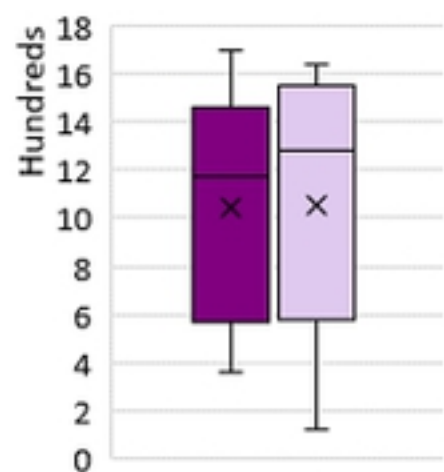
גם אם אתם לא סובלים מחרדת טיסה, אין ספק שבכולם מקננת חרדת שירותי מטוס קטנה ומובנת. אולי סוף סוף יגיע הקץ לסך כל הג'יפה של הנוסעים שביקרו בתא הקטן לפניכם?

מערכת ערוץ החופש | mako חופש | פורסם 06/03/16 10:09

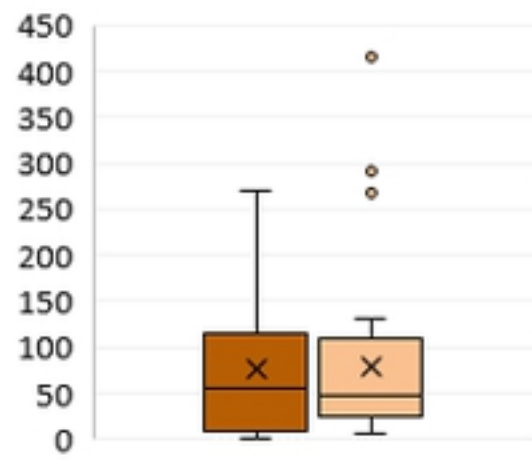
**a – Number of views (clicks on the item)**



**b – Average Time on page**



**c – Likes**



**d – Comments**

