

# Academic clickbait: articles with positively-framed titles, interesting phrasing, and no wordplay get more attention online.

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## Abstract

This article is about whether the factors which drive online sharing of non-scholarly content also apply to academic journal titles. It uses Altmetric scores as a measure of online attention to articles from *Frontiers in Psychology* published in 2013 and 2014. Article titles with result-oriented positive framing and more interesting phrasing receive higher Altmetric scores, i.e., get more online attention. Article titles with wordplay and longer article titles receive lower Altmetric scores. This suggests that the same factors that affect how widely non-scholarly content is shared extend to academia, which has implications for how academics can make their work more likely to have more impact.



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## INTRODUCTION

*You'll never believe these three amazing clickbait strategies that make people share psychology articles more!*

This study is about whether the factors which drive online sharing of non-scholarly content are also present in academic journal titles. Or to put it another way, are academics doing clickbait?

Clickbait is one of those words which is hard to define, but, like hardcore pornography, people know it when they see it (*Jacobellis v. Ohio*, 1964). More formally, clickbait is defined as "(on the internet) content whose main purpose is to attract attention and encourage visitors to click on a link to a particular web page" ('clickbait - definition of clickbait in English from the Oxford dictionary', 2016). While this description covers the function of clickbait, it doesn't fully differentiate it from other content. The main purpose of newspaper headlines is also to attract attention and encourage visitors to click on the link to the article, where sites earn revenue from advertising based on clicks and page views. However, newspapers generally follow up on the headline with content that justifies the headline, whereas clickbait content tends to be put together in a more cursory way; far more effort goes into attracting the click in the first place than creating content of value. Another difference is in the style. Both valid content headlines and clickbait exploit the curiosity gap (where headlines tease the reader by arousing their curiosity without providing details) and emotional language, but clickbait does so to a far greater extent. Clickbait is the empty calories of the internet, junk food wrapped in glamorous advertising that never quite satisfies but keeps you coming back for more.

For example, a typical clickbait headline might be "OMG! 4 incredible beauty tips that the salons don't want you to know. This. Changes. Everything." — it uses the curiosity gap, emotional language, and even off-the-wall punctuation to attract attention. However, the headline seriously exaggerates the main content, which would simply be something like "1. drink water 2. sleep well 3. do some exercise

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sometimes 4. eat vegetables".

None of this is new. In his 1910 essay "Heine and the consequences", Karl Kraus railed against the sloppy journalistic style of the feuilletons, or the tabloid-esque human interest papers of the time. What is striking is that Kraus' tirade is almost perfectly applicable to clickbait on the internet a century later:

*[Feuilletons exaggerate their headlines] "because their purpose would otherwise be obvious at a glance, and passers-by would not willingly have their pockets turned inside out twice a day. Curiosity is always stronger than caution, and so the chicanery dolls itself up in tassels and lace ... this type [of reporter] is either an observer who in opulent adjectives amply compensates for what Nature denied him in nouns, or an aesthete who makes himself conspicuous with his love of colour and his sense of nuance and still manages to perceive things in the world around him as deeply as dirt under a fingernail. And they all have a tone of discovery, as if the world had only just now been created, when God made the Sunday feuilleton and saw that it was good."* (Franzen, 2013, pp.39-47)

Despite the wide backlash against clickbait (Hamblin, 2014; 'The real problem with clickbait', 2014) and suggestions that clickbait is less effective than it used to be (Smith, 2014), it still seems to work. Recent studies of online media have identified properties of headlines or link titles which drive page views and shares. Berger and Milkman (2012) investigated New York Times article headlines and found that, after controlling for article length, author prestige, and location of the article on the home page, there were two main factors which drove how widely an article was shared (articles which are shared very widely are said to "go viral"). Firstly, positive articles were shared more widely than negative articles. However, this was also mediated by a second factor; the emotional impact of the article. Articles which elicited high arousal emotions, whether positive or negative, were shared more widely than articles which were less emotionally arousing. For example, "Wide-Eyed New Arrivals Falling in Love With the City" is coded as a positive article, while "Maimed on 9/11, Trying to Be Whole Again" is coded as a negative article having high-arousal emotion, and "Voter Resources" was coded as having low-arousal emotion. In an analysis of the social media platform Twitter, Hansen et al. (2011) found that the effect of emotional affect on virality in tweets (i.e. how widely a tweet is shared) depended on the type of tweet; positive sentiment lead to increased sharing of non-news-related tweets, whereas negative sentiment lead to increased sharing of news-related tweets. As clickbait covers both news and general interest content, emotional arousal in either direction may help attracting clicks and subsequent sharing of content.

Another common clickbait technique is forward reference, or referring to something with a demonstrative before introducing the referent (e.g. "This is why you should read this article"). Blom and Hansen (2015) found that commercialisation and tabloidisation of online newspapers lead to increased forward reference in headlines. This appears to be a deliberate strategy on the part of the editors. In extensive observation of newsrooms and interviews with journalists and editors, Tandoc (2014) showed that editors use audience analytics to prioritise the content and style of their articles in order to drive more clicks, even to the point where "you have to hold your nose" and prioritise the articles that get clicks over the articles that have substance.

One other technique that newspaper and clickbait headlines use is including a question. This may attract more readers by exploiting the curiosity gap even more. In computer-mediated experiments, titles with questions generated higher readership than titles without (Lai & Farbroth, 2013), so while the old adage says that any headline which ends in a question can be answered with "no" ('Betteridge's law of headlines', 2016), it does seem to work nonetheless.

Many of the techniques in online media apply to academia too, although the findings so far are mixed. Academics write articles which they want to be read and shared as widely as possible, and need to write titles and abstracts which make the article sound as appealing as possible. This is not just a point of pride; academics are assessed and funding is awarded based on the impact and citations of an academic's articles. Certain writing strategies can help boost attention; articles with shorter titles (Letchford, Preis, & Moat, 2016) or simpler language in their abstracts (Letchford, Moat, & Preis, 2015)

get cited more often. The structure of an article's title affects download and citation rates as well; Jamali and Nikzad (2011) found that articles in PLOS journals with questions in the title were downloaded more often but cited less often, while titles with a colon (a proxy measure of an article with a secondary subtitle) were longer and were downloaded and cited less often. This is further evidence for shorter, simpler titles having an advantage when it comes to sharing. In contrast, Fox and Burns (2015) examined articles from *Functional Ecology* and found that having a subtitle did not predict lower citations. They also found that articles with the specific names of organisms in the titles were cited less often than articles without specific names in the title, and concluded that the features of article title structure that they looked at had little or no effect on an article's later success.

These studies address citation rates, which are hugely important to academics but don't necessarily reflect the interest shown by the general public. Milkman and Berger (2014) found four factors which increased non-scientists sharing scientific work. As with their 2012 study on New York Times articles, research which is more positive and which evokes a stronger emotional response is shared more. In addition, research which is perceived as more interesting and more useful is also shared more.

In recent years, academics have turned to alternative measures to track the success of their articles with the wider public, such as media attention, sharing on social media, page views and article downloads, and so on. Collectively, these are known as altmetrics. Altmetrics provide a useful short term measure of article success, as they measure the reception to an article immediately after publication, as opposed to citations which take years to accumulate. Altmetrics have been shown to correlate with later citation count (Thelwall, Haustein, Larivière, & Sugimoto, 2013), although the factors driving social media sharing and academic citation may be different (Haustein, Costas, & Larivière, 2015) due to differences in what academics and non-academics find interesting and different citation practices in different research fields. Accordingly, while altmetrics cannot be considered as direct alternatives to citations, they are a good way of measuring how much and how widely academic work gets shared by non-academics. Altmetric is a company which provides altmetrics scores by tracking various social and traditional online media for mentions of a specific article (Adie & Roe, 2013). Each article receives an Altmetric score based on the amount of attention it is getting online. Altmetric does not publish exactly how their scores are calculated, but they say that an Altmetric score reflects a weighted count of online attention designed to reflect the volume and reach of online engagement surrounding an individual research output.

Academics don't (yet) use full clickbait-style headlines (although the disparity between academic articles, their press releases, and subsequent general media coverage, means that academic news coverage is frequently misleading (Brookshire, 2014; Hughes, 2014; Sumner et al., 2014)). However, the properties of titles which drive the sharing of news media may hold for academic articles too.

## **METHODS**

I wanted to investigate the features of academic article titles which drive how widely an article is shared, and whether that is similar to clickbait measures outlined by previous research into non-academic content. I used Berger and Milkman's (2012) factors of the positivity of the content and the emotional arousal of the content as a basis. Since they analysed New York Times articles, those categories cannot apply to academia exactly, but they can be tweaked slightly to more accurately reflect how academic titles are written.

For positivity, I looked at whether the title framed the research positively, in that the study explicitly discovered or confirmed something, and that the title reflects this in a results-oriented way. For example, "smoking causes lung cancer" and "vaccines do not cause autism" would both be considered as having positive framing, not so much because of the sentiment of the topic but because of the result. A non-positive framing would be something like "the relationship between smoking and lung cancer" or "an investigation into whether vaccines cause autism".

For emotional arousal, I split this category into two factors; whether the *topic* of the article had social

currency, and whether the *title* of the article used arousing phrasing. I defined a topic with social currency as something that non-academics might find interesting to know about and might gain social currency from - i.e. would a non-academic sound impressive and interesting if they were talking about this topic to their non-academic friends in the pub? Using my own research as an example here, an article about how Dutch people are sensitive to the meanings of Japanese words even though they don't speak Japanese has social currency, whereas an article about how the use of a different category of words changes the P2 and late positive complex ERP responses during sentence reading definitely doesn't (you can trust me on that one). I defined arousing phrasing as using more general and less technical terminology, using interesting or eye-catching turns of phrase, and using the curiosity gap.

As a set of examples, I once participated in an experiment where I received TMS to the Angular Gyrus to disrupt mathematical processing and then performed a gambling task where I had to calculate probabilities and bet small stakes on a roulette wheel. That article title could be phrased one of four ways when looking at positive framing and phrasing arousal, as shown in Table 1.

Table 1: examples of possible titles

|                            | <b>Phrasing Arousal</b>  | <b>No Phrasing Arousal</b>  |
|----------------------------|--|---|
| <b>Positive Framing</b>    | Reduced mathematical ability makes you a worse gambler             | TMS to the Angular Gyrus negatively impacts mathematical decision-making                      |
| <b>No Positive Framing</b> | The relationship between gambling and reduced mathematical ability | Exploring the relationship between mathematical decision-making and TMS to the Angular Gyrus. |

I also looked at three other factors: the number of words in the title, whether the title had a question in it, and whether the title had wordplay in it. This created six factors of interest to the analysis: four ways an article's title could be clickbait-y in positive framing, phrasing arousal, having wordplay in it, and having a question in it, and two more prosaic measures in title length and social currency of topic.

I created a spreadsheet of every title of every article published in *Frontiers in Psychology* journals throughout 2013 and 2014. I chose *Frontiers in Psychology* due to its open access status, as open access articles are more likely to be shared online (Wang, Liu, Mao, & Fang, 2015). After removing corrigenda, book reviews, responses, and duplicates, there were 2136 articles. As the factors of interest are rather subjective ("I know clickbait when I see it"), titles were judged as having or not having positive framing, phrasing arousal, wordplay, and social currency by three raters. The raters were all native English speakers across three departments at the Max Planck Institute for Psycholinguistics: myself (Neurobiology of Language), AF (Psychology of Language), and ES (Language and Genetics). Raters were given the following fictitious examples in Table 2 to guide them, but were encouraged to make their own judgments.

Table 2: example ratings with fake titles

| <b>Title</b> | <b>Positive Framing</b> | <b>Social Currency</b> | <b>Phrasing Arousal</b> | <b>Wordplay</b> |
|--------------|-------------------------|------------------------|-------------------------|-----------------|
|              |                         |                        |                         |                 |

|   |   |   |   |   |
|---|---|---|---|---|
| <b>Holy smokes!<br/>The link between<br/>lung cancer and<br/>smoking</b>  | 0 | 1 | 1 | 1 |
| <b>Smoking<br/>cigarettes<br/>causes lung<br/>cancer</b>  | 1 | 1 | 1 | 0 |
| <b>Prolonged<br/>cigarette<br/>consumption<br/>increases chance<br/>of developing<br/>pulmonary<br/>carcinoma</b> | 1 | 1 | 0 | 0 |
| <b>Does the MMR<br/>vaccine cause<br/>autism?</b>   | 0 | 1 | 1 | 0 |
| <b>The link between<br/>the MMR vaccine<br/>and autism</b>  | 0 | 1 | 1 | 0 |
| <b>The link between<br/>FOXP2 and<br/>cerebellar<br/>development</b>  | 0 | 0 | 0 | 0 |
| <b>Iconicity in<br/>nonwords affects<br/>size judgements</b>  | 1 | 0 | 0 | 0 |
| <b>How big does<br/>that sound?<br/>Language, brain,<br/>and crossed<br/>senses</b>                               | 0 | 1 | 1 | 1 |

After rating all the article titles, AF and ES were compensated by GL for their time and effort with dinner and beer. Raters gave similar ratings for positive framing and wordplay, but there was more variation for phrasing arousal and social currency. Therefore, I took a "best of three" approach; for each measure, for each article, I took the majority decision from at least two of the three raters (see Table 3).

Table 3: percentage of titles with and without the different factors

| <b>Rater</b> | <b>Positive Framing</b> | <b>Phrasing Arousal</b> | <b>Social Currency</b> | <b>Wordplay</b> |
|--------------|-------------------------|-------------------------|------------------------|-----------------|
| <b>GL</b>    | 18.40%                  | 37.45%                  | 58.94%                 | 5.57%           |

|                      |        |        |        |       |
|----------------------|--------|--------|--------|-------|
| <b>AF</b>            | 20.97% | 12.45% | 20.22% | 1.30% |
| <b>ES</b>            | 16.62% | 11.19% | 18.68% | 5.76% |
| <b>Best of Three</b> | 18.31% | 15.22% | 26.45% | 3.58% |

Whether a title had a question in it was determined by the presence of a question mark; 8.24% of article titles featured a question. Title length was calculated in R by counting the number of words in the string. Title length was normally distributed with a mean of 12.28 words.

As an example of the titles in the dataset, a title which was rated as having positive framing, phrasing arousal, and social currency was "Let's look at leeks! Picture books increase toddlers' willingness to look at, taste and consume unfamiliar vegetables". A title which was rated as having none of the categories was "On interpretation and task selection in studies on the effects of noise on cognitive performance".

To measure how widely an article was shared, I used Altmetric scores. On October 2nd 2015, I obtained Altmetric scores for all 2136 articles. Article title ratings were performed with no knowledge of the article's Altmetric score; AF and ES did not see the Altmetric scores at all, while I only examined the Altmetric scores after finishing my ratings.

The older articles had more time to potentially attract more attention, but it is more likely that online attention to the vast majority of articles happens immediately after publication and then plateaus; while 2013 articles had a mean Altmetric score of 10.76 and 2014 articles had a mean Altmetric score of 9.38, this was not significantly different ( $t=1.06$ ,  $p=0.29$ ).

I investigated the effect of phrasing arousal, positive framing, wordplay, and question while controlling for social currency and title length. I hypothesised that articles with social currency would have a higher Altmetric score simply due to being more interesting to more people, and that articles with shorter titles would have a higher Altmetric score based on the findings of Letchford et al. (2015) that there is a citation advantage for articles with shorter titles. I further hypothesised that all four linguistic measures - positive framing, phrasing arousal, wordplay, and question - would also increase an article's Altmetric score.

## RESULTS

Most articles don't get that much attention online; the mean Altmetric score of all articles was 9.92, and ranged from a score of 1 to 491. All measures were positively skewed. When looking at simple means, positive framing and phrasing arousal showed possible positive effects on Altmetric score, while the effects wordplay and question appeared to be quite small (see Table 4). This data is plotted in Figure 1.

Table 4: mean Altmetric score per factor

|            | <b>Positive Framing</b> | <b>Phrasing Arousal</b> | <b>Wordplay</b> | <b>Question</b> |
|------------|-------------------------|-------------------------|-----------------|-----------------|
| <b>Yes</b> | 13.72                   | 17.15                   | 8.55            | 12.31           |
| <b>No</b>  | 9.06                    | 8.62                    | 9.97            | 9.70            |

Moreover, there was only a slight, insignificant correlation between title length and Altmetric score ( $r = -0.04$ ,  $p=0.0827$ ). While articles with shorter titles might get cited more, this data does not initially

confirm that articles with shorter titles get talked about more. This is shown in Figure 2.

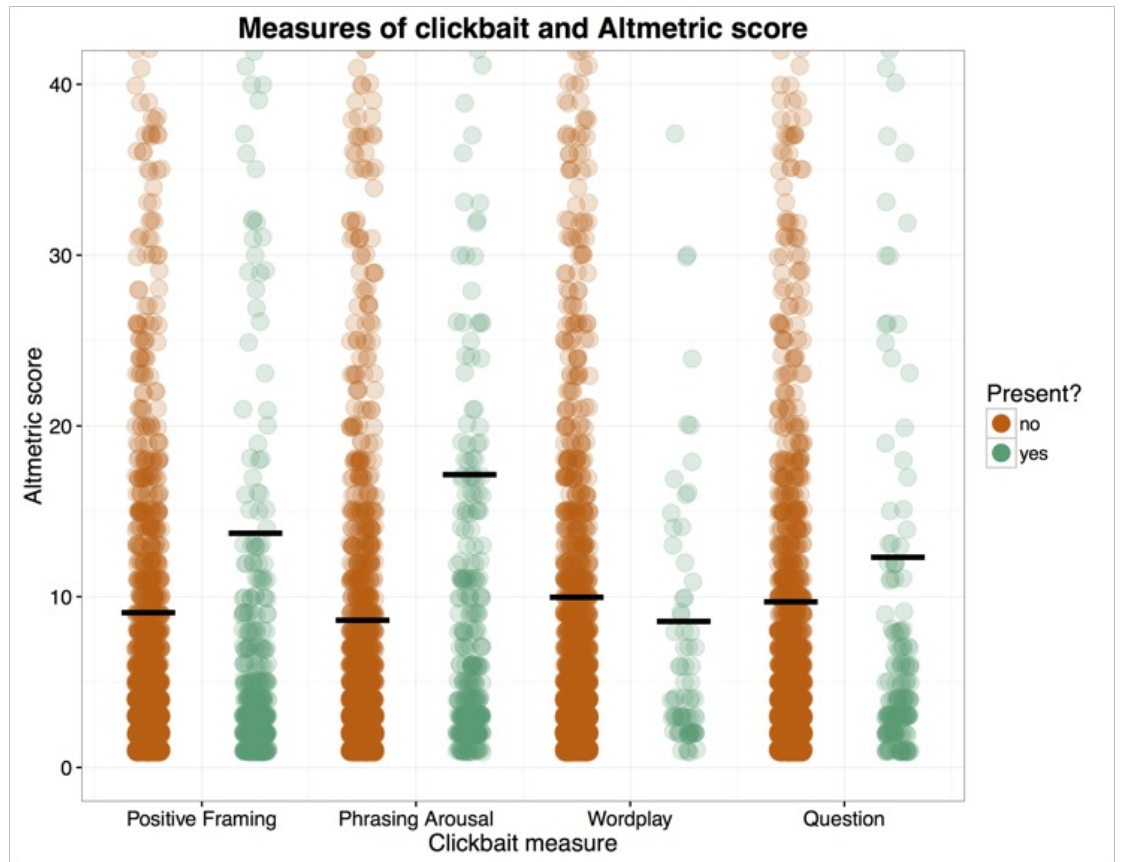


Figure 1: plot of main clickbait measures and mean Altmetric score (zoomed in on Altmetric scores up to 40).

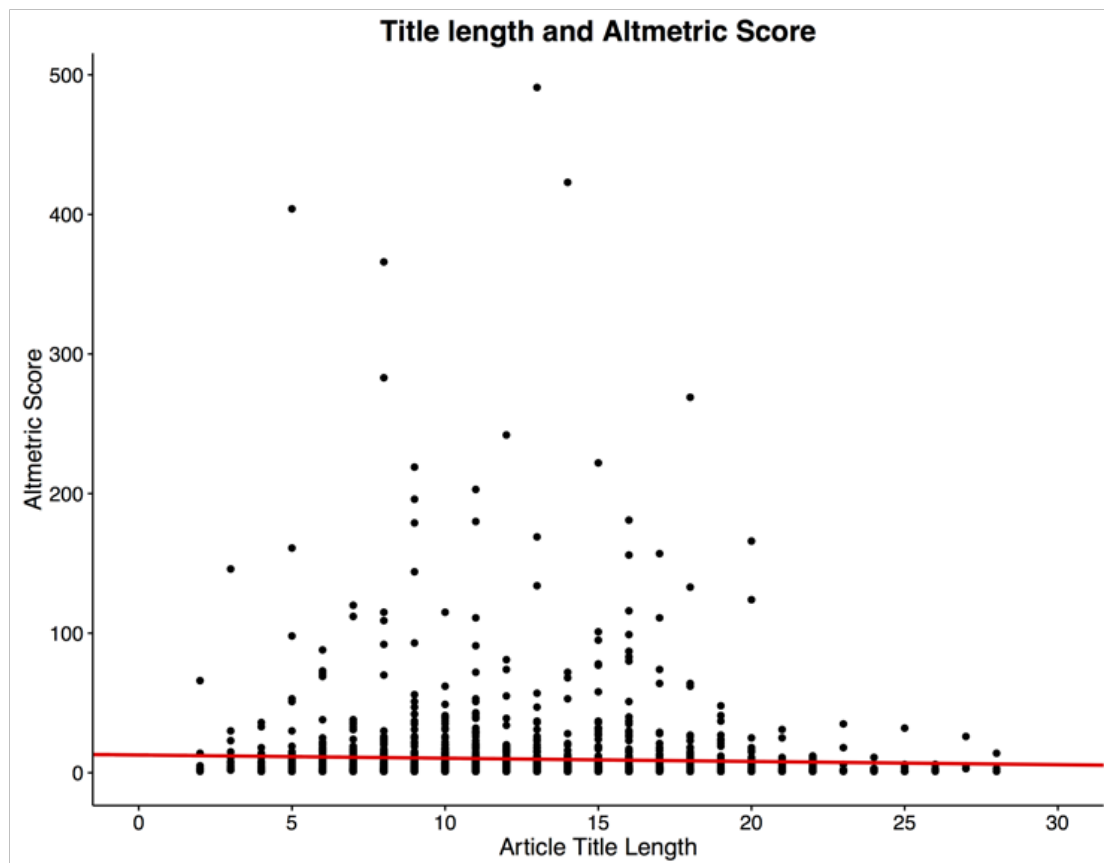


Figure 2: slight correlation between title length and Altmetric score.

As you can see in Figure 2, the Altmetric score data was positively skewed, so I log transformed it before running the linear regressions. I first ran a model looking at only social currency and title length as fixed effects; title length was an expected effect due to earlier research, while social currency made sense as a predictor in that more interesting articles would get shared more often regardless of how an article's title was phrased.

I then added each clickbait measure as a main effect to see whether it improved the fit of the model. As expected, social currency ( $t=23.12, p<0.0001$ ) and title length ( $t=10.90, p<0.0001$ ) were significant effects in the first model. The model's fit was improved by adding positive framing ( $p=0.021$ ), phrasing arousal ( $p<0.0001$ ), and wordplay ( $p=0.027$ ). However, adding question to the model did not improve the fit of the model ( $p=0.84$ ).

Accordingly, I report the full model which modelled fixed effects of positive framing, phrasing arousal, wordplay, social currency, and title length. This model was coded as follows:

```
lm (ScoreTransformed ~ PhrasingArousal + PositiveFraming + Wordplay + SocialCurrency + Length)
```

Reported estimates have been transformed back from log scale into Altmetric scores.

Table 5: model summary statistics

| Estimate | Standard Error | t value | p value |
|----------|----------------|---------|---------|
|----------|----------------|---------|---------|

|                         |       |        |       |          |
|-------------------------|-------|--------|-------|----------|
| <b>Intercept</b>        | 4.55  | 0.067  | 22.73 | < 0.0001 |
| <b>Phrasing Arousal</b> | 3.46  | 0.072  | 7.84  | < 0.0001 |
| <b>Positive Framing</b> | 0.75  | 0.060  | 2.56  | 0.011    |
| <b>Wordplay</b>         | -1.20 | 0.14   | -2.21 | 0.027    |
| <b>Social Currency</b>  | 3.05  | 0.052  | 9.77  | < 0.0001 |
| <b>Title Length</b>     | -0.13 | 0.0051 | -5.74 | < 0.0001 |

I also ran a model comparing all possible interactions between clickbait factors, which still found the main effects individually, but no interaction was significant.

This confirms that articles with social currency and shorter titles get higher Altmetric. It shows that some clickbait strategies work in academic titles; positive framing and phrasing arousal lead to higher Altmetric scores, while, surprisingly, articles with wordplay in the title get lower Altmetric scores, and having a question in the title makes no difference. This suggests that positive framing and phrasing arousal facilitate the amount of online attention an academic article gets.

## DISCUSSION

What makes online content go viral appears to hold for academia as well, or at least for articles in *Frontiers in Psychology*. The positive framing of an article's findings in the title and phrasing the title in an arousing way increases how much online attention an article gets, independently of non-clickbait measures like how interesting the topic is or the length of the title. However, including a question in the title makes no difference, and having wordplay in the title actively harms an article's Altmetric score. This suggests that academic media is treated similarly to non-academic media by the public in terms of what initially attracts people's attention.

As an academic researcher myself, this is something I've been trying to exploit in my own titles. I work on a fairly niche topic; iconicity (or how much a word sounds like what it means) in Japanese ideophones (or words which are like onomatopoeia but much more so). For my last two articles, I tried to use these measures as much as possible without overstating my own work.

Table 6: application to my own work

|                  | <b>Working Title</b>   | <b>Eventual Title</b>  |
|------------------|--|--|
| <b>Example 1</b> | The neural correlates of Japanese ideophones versus arbitrary adjectives in sentence reading | Ideophones in Japanese modulate the P2 and late positive complex responses |
| <b>Example 2</b> | Sound symbolism increases recognition rate in a foreign word learning task                   | Sound symbolism boosts novel word learning                                 |

The first article is very specific; it has positive framing, but not arousing phrasing, and has only managed to get an Altmetric score of 4 (<https://www.altmetric.com/details/4234548>). However, the

second article was much more successful, with an Altmetric score of 49 (<https://www.altmetric.com/details/5100879>). In addition to the positive framing, I used the more exciting verb "boosts" rather than simply "increases", and referred to the task that my participants did as "novel word learning", which sounds more exciting than a more descriptive "recognition rate in a foreign word learning task". In the case of the second article, it seems like using the measures from this study have helped.

There are, of course, many caveats to this finding. Firstly, my measures of positive framing and phrasing arousal were inspired by Berger and Milkman (2012), but the difference between academic article titles and online media content necessitated a slight reinterpretation. My creation of measures was still blind to the data, but other academics may interpret how positivity and emotional arousal à la Berger and Milkman (2012) apply to academia differently.

Secondly, Altmetric is a relatively new measure which has only caught on in the last few years. Academics publishing articles in 2016 are more aware of alternative metrics than they were in 2013 and 2014, and so there may well be a more concerted effort by academics to share their research on social media now. This means that mean Altmetric scores for articles in 2016 may be higher. Additionally, while Altmetric scores do measure how much attention an article is getting online, this does not necessarily speak for how interesting or how good an article is. One notable example is an article in the journal *Ethology* (Culumber, Bautista-Hernández, Monks, Arias-Rodriguez, & Tobler, 2014). This article has a very high Altmetric score of 1983 at the time of writing (for comparison, the highest score in my dataset was 491) and is the 126th highest score out of over five million articles tracked by Altmetric (see <https://wiley.altmetric.com/details/2808007> for details). However, all the attention is because slack version control by the authors and poor copyediting by the journal meant that the phrase "(should we cite the crappy Gabor paper here?)" was left in the published article from an earlier draft. Similarly, a now-retracted article in PLoS ONE (Liu, Xiong, Xiong, & Huang, 2016) gained an Altmetric score of 1886 (see <https://www.altmetric.com/details/4960221> for details). In this article, a translation error by the authors and poor copyediting by the journal meant that a 21st century biology article attributed the biomechanical configuration of the human hand to "the proper design by the Creator". This shows that Altmetric can measure the amount of attention an article is getting, but it doesn't account for the reason for the attention. As a final note of caution, the discrepancy between articles, press releases, and media coverage is already rather worrying (Sumner et al., 2014); if academics in opulent adjectives amply compensate for what Nature denied them in nouns, scientific research may become more misrepresented in public discourse than it already is.

Further studies should look at other journals than *Frontiers in Psychology*, and other fields than *Psychology*. Additionally, author data was not present in the dataset I obtained; this meant that I could not model individual authors as random effects. Modelling individual authors would additionally control for some authors possibly having a more natural clickbait-y style to their titles, and for some authors getting more attention than others due to being more well-known inside and outside the field. It is not possible to tell from this dataset whether academics are writing titles like this strategically, or whether the academics writing titles with positive framing and phrasing arousal just write it like that because they like it. Qualitative data from academics about their publishing practices would be a useful addition. Another factor that this study does not address is the specificity of the article's topic; it may be that you can write catchy titles for general articles of general interest, while articles which are far more specific don't lend themselves to phrasing arousal so easily. However, the flipside of that is that it may be easier to formulate titles with positive framing for specific articles testing specific hypotheses, while general articles cannot be so easily framed. Finally, longitudinal studies would be interesting; it could be that positive framing and phrasing arousal only work when they are represented in the minority of article titles. If everybody did this with their titles, perhaps the titles with neutral framing and dull phrasing would stand out from the crowd and get more attention, although this seems unlikely.

Clickbait had a brief period where certain manipulations in link titles were vastly successful at driving clicks and shares. In recent years, there has been a backlash against clickbait, possibly because

people on the internet have become more intolerant of it and/or recognise it more easily. It remains to be seen whether the same thing will happen in academia. For now, this research shows that academics can use clickbait strategies to their advantage by framing their findings positively and using more arousing phrasing in their article titles. Academics should also make their titles shorter, and most importantly, try to make their research actually interesting.

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