

All together now: disentangling Beatles' song titles in medical research articles

Stefania Maci (✉ stefania.maci@unibg.it)

University of Bergamo

Cherubino Di Lorenzo

Catello Vollono

Article

Keywords: RA Titles, corpus linguistics, discourse analysis, Beatles

Posted Date: March 20th, 2023

DOI: <https://doi.org/10.21203/rs.3.rs-2652299/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background

The purpose of this paper is to understand the reason(s) why Beatles' song titles are used as titles for medical research publications.

Methods

546 article titles have been collected over a period of 57 years (1965–2022) and linguistically analysed. Titles were classified according to three different perspectives: (1) a textual perspective (level of informativeness); (2) a sentence viewpoint (information packaging and meaning); and at (3) the lexical level (degree of accessibility and referential transparency).

Result

Here we show that the Beatles' quotations have gradually augmented over the years, with a peak in 2002, and then a gradual rise up to 2021, with a preference for using compound (57.32%) and nominal (38.09%) titles. As to the way in which information is packaged, titles are primarily focus ones (62.08). Interestingly, well 75.64% titles are constructed with no specialized language, while only 5.86% titles are 'language as mention', that is titles with markedly non-specialized items which appear to be borrowed from the song itself and stylistically marked with the actual quotations

Conclusions

Our findings suggest that, by quoting a Beatles song title, the author of the publication clearly creates an attention-seeking device with startling effect. Such an approach does not appear to be dependent on a specific period of time, journal, or Beatles song. They can thus be defined as *attractors*.

Plain Language Summary

Beatles' song titles are used as titles for medical publications. To understand why they are used as research article titles, we collected 546 title articles containing a Beatles' song title and classified them according to three different perspectives: their level of informativeness; (2) the way in which information is packaged to convey meaning; and (3) their degree of accessibility and referential transparency. Results show that the Beatles' quotations have augmented over the years, with a peak in 2002. There is a preference for titles combining the Beatles' song title followed by the medical topic dealt with, and for titles which do not contain specialised language. Findings suggest that these titles are attractors: they create an attention-seeking device with startling effect.

1. Introduction

The purpose of article titles in science is that of synthetically introducing the topic the research article (RA) will deal with and, at the same time, making that topic interesting. Not only do they allow the reader to locate relevant content, but also, they are used for indexing purposes¹ and are indicative of a publication's strengths and informativity², which seems to be prevalent in most biomedical journals³.

There are guidelines as to how construct an RA title; nevertheless, creating an RA title is not simple. It seems that long and complex titles have become even longer, and more complex, as scientific fields mature^{2,4}. However, given that titles constitute the most concise statement of an article's content, and that they are heavily used by information retrieval systems, titles should be as informative as possible², which has traditionally been determined on the basis of the number of substantives an article has⁵. An average of around 13 words per title in articles, notes and reviews have been reported⁶ from British biomedical journals published from 1981–2001, with variability generally ranging from 11⁷ to 15⁸, and even to 18 words⁹. RA titles are referential and informative because they concisely lead to the RA's investigation¹. In this regard, they are seen as an anticipatory device because they are “front matter and summary matter”¹⁰. They are also a text in miniature, one which provides information as well as an initial introduction¹¹. This is the reason why “they are expected to contain recognizable key terms and expressions on the basis of which the reader can measure the correspondence of the propositional content in the title to his/her own interests or search criteria”¹. In this respect, titles may be indicative of the text style and register of the whole RA or of the type of RA investigation applied¹. For this reason, the relationship between a title's linguistic and semantic aspects and content complexity in RA texts have also been studied⁴. In addition, titles are relevant for the initial cognitive representation of the whole text they represent^{1,12} while, at the same time, guiding its interpretation: they are, in other words, the criterion against which to measure the RA's degree of informativeness and relevance¹³.

It remains unclear how the structure of an RA title influences its readership and impact, but certainly a poorly chosen title makes a paper difficult to discover or discourages its readership, thus reducing the paper's impact¹⁴. In this regard, “there is evidence that doctors sometimes make clinical decisions from the titles of journal articles”². While there is an effort to achieve a close integration between empirical research and pedagogical advice⁶, when it comes to titles, “recommendations of scientific journal editors [...] are largely based on their personal experiences”¹⁵ and are therefore subjective².

Although the title structure tends to reflect disciplinary and/or editorial preferences^{2,8} the structure of titles depends on other variables¹⁶, namely:

- i. title length – which is directly proportional to the number of authors in almost all disciplines (and the most recent papers have more authors than papers published earlier);
- ii. the use of colons and question marks – which tends to decline with increasing author numbers^{17,18};
- iii. the number of paper citations – which is higher when the titles are shorter and lower when paper have question marks, and yet lower when they use question marks.

Notwithstanding, titles are part of the publishing environment they serve, although “[t]he trend is undoubtedly for journals to become more like newspapers” with the double purpose of readability and trying to grab people’s attention”¹⁹. Indeed, titles have a persuasive purpose: they codify meaning *and* attract the reader’s attention, to such an extent that they can even affect an RA’s citational status or impact factor in the long run^{1, 7, 20}. Furthermore, titles can also have an implicit promotional function for authors: with a persuasive and promotional type of discourse²¹ they can disclose information about the author’s persona, the author’s way of conceiving and conducting research as well as the author’s place in the academic community¹.

All this, together with the “publish or perish” pressure²² characterizing, in particular, the medical community, as well as the relevance of the Impact Factor (which, in some cases, can be more relevant than the research itself^{23, 24, 25}) has necessitated the elaboration of strategies to increase the number of citations. A strategy seems to be the quotation of popular song titles to attract more readers. To the best of our knowledge, there has been hardly any analysis of medical RA titles constructed with popular groups’ or singers’ song titles. Indeed, only Bob Dylan (cf. the article published in 2014 on *The Guardian* website, available at <https://www.theguardian.com/music/2014/sep/29/swedish-scientists-bet-bob-dylan-lyrics-research-papers>)²⁶ and Beatles song titles have been shown to be used particularly, also probably on the basis that researchers “who used Beatles and Dylan quotes would by now be close to retirement, as they might have been teenage fans when the Beatles and Dylan were scoring most of their hits”²⁶ or because “the Beatles and Dylan are a sophisticated type of music and as such get noticed by ‘sophisticated scientists’ when they are at an age ready to publish scientific articles”²⁶. It has been suggested²⁷ that Bob Dylan song titles have become more and more popular as RA titles since 1990 and that this popularity may be due to the fact that “the young and radical students of the 1960s who listened to Dylan ended up as medical doctors and scientists”, which is true not only for medical doctors but also for meteorologists and climate impact scientists²⁸.

However, Beatles’ song titles seem to be used more frequently than Bob Dylan ones, despite the fact that Bob Dylan was awarded the Nobel Prize for literature in 2017. Considering that no one has ever investigated Beatles song titles²⁶, in the following sections we will try to show the extent to which Beatles song titles are used in medical RA titles to attract readers and to explain why researchers do so.

To understand why they are used as research article titles, we collected 546 title articles containing a Beatles’ song title and classified them according to three different perspectives: their level of informativeness; (2) the way in which information is packaged to convey meaning; and (3) their degree of accessibility and referential transparency. Results show that the Beatles’ quotations have augmented over the years, with a peak in 2002.

Results indicates that the Beatles’ quotations have gradually augmented over the years, with a peak in 2002, and then a gradual rise up to 2021, with a preference for using compound (57.32%) and nominal (38.09%) titles. As to the way in which information is packaged, titles are primarily focus ones (62.08).

Interestingly, well 75.64% titles are constructed with no specialized language, while only 5.86% titles are 'language as mention', that is titles with markedly non-specialized items which appear to be borrowed from the song itself and stylistically marked with the actual quotations

Our findings suggest that, by quoting a Beatles song title, the author of the publication clearly creates an attention-seeking device with startling effect. Such an approach does not appear to be dependent on a specific period of time, journal, or Beatles song. They can thus be defined as *attractors*.

2. Methods

As described above, titles are used by information retrieval systems². Indeed, in any retrieval system, fields normally used for indexing are author's title, abstract, journal title and journal type. One of the most popular retrieval systems is PubMed®. PubMed® is a free resource supporting the search and retrieval of biomedical and life sciences literature with the aim of improving health – both globally and personally, it has a database comprising more than 33 million citations and abstracts of biomedical literature from MEDLINE, life science journals, and online books (<https://pubmed.ncbi.nlm.nih.gov/about/>).

In order to identify titles constructed from Beatles songs, we followed these steps:

1. We checked *The Beatles Bible* (www.beatlesbible.com/songs) to see all Beatles songs listed by singer (McCartney, Lennon, Starr, Harrison), for a total of 207 songs; we were only interested in songs written by The Beatles, and not in those where they had covered others' work. For example, Beatles' cover versions of classics, such as *Besame mucho* by Velázquez-Skylar, were excluded from further analysis.
2. We used PubMed®/MEDLINE as a search interface with advanced filters (i.e. *search title*), given that this search engine uses a stop-word list consisting of commonly found terms which are not included in a search. Next to the exact song title, we also found numerous title variations.
3. We excluded song titles where it was difficult to unequivocally attribute such a title to a specific song. For example, the RA title *Birthday*, which could apparently refer to the Beatles song, actually referred to 'festchrifts' in honour of some scholar on the occasion of his/her birthday – and for this reason it was excluded; the search of *A day in the life* yielded 544 results (comprising exact titles and extended titles), and it was virtually impossible to establish a direct link to the song: therefore, the exact title was considered only; *Michelle* was found in more than 47,000 titles, but it was linked to it the name of a person interviewed/ involved in the RA, and, thus, cannot in any possible way be linked to the Beatles song.
4. Song titles consisting of a general term or expression, such as *Yes it is*, were checked manually for the context in which they were used. In most cases the publications were not considered for investigation.

The search resulted in 546 titles constructed with Beatles song titles or having an intertextual connection to them.

We used an integrated model¹ to analyze RA titles and assess the efficiency of several alternative structures, including factors and criteria from other research^{4, 11, 29,30}.

This model examines such strategies on three levels:

- the textual level (distinguishing between nominal, compound, and full-sentence constructions), from which it is possible to measure the degree of informativeness found in titles^{3, 10, 31, 32};
- the sentence level, especially at the level of syntactic relations between nominal, verbal, and prepositional phrases (differentiating between topic, bi-head, and focal titles)⁷;
- the lexical level, accounting for the presence of specialized and domain-specific lexis, through which to measure the specificity of titles and their gate-keeping function, in that specialized lexis determines the degree of text accessibility and appeal^{16, 17}.

The application of such a model to our corpus allowed us to: 1) determine which title typology is best for RAs, 2) discuss its prototypicality in relation to the disciplinary epistemology that underpins medical research, and 3) account for the possible degree of variation in titling practices over time.

3. Results And Discussion

The search of RA titles constructed with Beatles song titles with PubMed® yielded 546 titles in medical publications, and a total of 55 different songs were quoted, as can be seen in Supplementary Table 1.

The top Beatles song titles employed to construct RA titles are: *A day in the life* (16.6% of all publications); *All together now* (15.75%); *With a little help from my friends* (11.35%); *Here comes the sun* (5.67%); *Ticket to ride* (5.12%); *A hard day's night* (4.39%); *Come together* (4%); *We can work it out* (3.11%); *Bad Boy* (2.56%); *Run for your Life* (2.56%); *Twist and shout* (2.56%); *Hello Goodbye* (2.19%); and *Magical mystery tour* (2%), which overall correspond to 78% of all Beatles quotations.

As can be seen in Supplementary Figure 1, Beatles quotations have gradually augmented over the years, with a peak in 2002, and then a gradual rise up to 2021 (with a drop in 2022, due to the fact that the research ended in January 2022).

The academic journals that have more titles constructed with Beatles song titles (Supplementary Table 2) are the *Journal of the American Academy of Physician Assistants*, where we find 26 quotations of *A day in the life*; *Nature*, where there are overall 10 Beatles title quotations (*All together now*, *Bad Boy*, *Come together*, *Run for your Life*); *Nursing Standard* which has 19 publications constructed with Beatles song titles (*All together now*, *A day in the life*, *A hard day's night*, *Day Tripper*, *Getting better*, *Help!*, *Ticket to ride*), and *Nursing Times* which has 51 publications with Beatles quotations in their titles (*All together now*, *A day in the life*, *A hard day's night*, *Eight days a week*, *Hello Goodbye*, *Help!*, *Here comes the sun*, *Ticket to ride*, *We can work it out*, *With a little help from my friends*), with an overall preference for the

following songs: *All together now* (4 journals); *A day in the life* (3 journals); *A hard day's night*; *Come together*, *Help!*, and *Ticket to ride* (2 journals).

Supplementary Table 3 shows the breakdown of the top medical fields where Beatles song titles are used. As can be seen, (medical) *practice*, *nursing* (activity), *healthcare* and *microbiology* are the domains where Beatles song titles are mostly quoted. Overall, however, almost 50% of the titles constructed with Beatles songs are found in 9 medical fields, in a time span from the 1980s to the 2020s, except for the nursing field, where titles constructed in this way have been used ever since the 1960s.

Among the top titles used in the various fields, *A day in the life* is the most quoted Beatles song title with 35 hits in both *practice* and *nursing*, while *All together now* is particularly present in *nursing* (13 hits) and *healthcare* (12 occurrences).

We did not analyze the impact that songs can have when compared to the geographical distribution of authors' affiliations as this information may be distorted: the decision to construct a publication title with a Beatles' song may also depend on what the academic journal stylesheet or publication guidelines allow. Furthermore, an author may have a different geographical origin from the geographical distribution of her/his affiliation – which might imply cultural variables. In addition, although 281 (51.4%) publications are by one single author, 221 (45.4%) publications are co-authored (the remaining ones are anonymous): in the latter case, co-authors do not necessarily have the same affiliation. Similarly, we decided not to analyze the authors' gender distribution because, culturally, gender is a fluid notion and, in the case of co-authored publications, what title to use might be a team decision.

Ten authors tend to always publish their contributions (23 in total; 18 editorials and 5 RAs) with titles reproducing Beatles song titles, which seems to be a personal preference/style.

When we come to the type of article published which quotes a Beatles song title, we could detect that the most common types of publications (that is, RAs, editorials and commentaries, reports and clinical trials, popularized articles and personal notes) are, obviously, also those where Beatles song titles are most quoted. As can be seen in Supplementary Table 4, the three most frequently quoted song titles are: *A day in the life* (81 quotations altogether), *All together now* (45 quotations), *With a little help from my friends* (39 quotations).

Not all types of publications have been here reported, as the remaining publications cannot be reconciled to a common prototypical category; furthermore, not all Beatles song titles are indicated in Table 4, because in most cases there was only one single quotation.

If a publication entitled *A day in the life* may be intuitively understood as a type of article which is actually the scholar's personal note or report of a typical day in the profession, in all other cases, the presence of a quotation from a Beatles song title could not be accounted for. For this reason, a more in-depth investigation has been necessary.

Titles can be classified¹ based on: (1) the textual perspective, on the basis of which it will be possible to measure their level of informativeness^{3, 10, 31, 32}; (2) the sentence viewpoint, to examine how information is packed in order to produce a recognizable and effective meaning; and (3) the lexical level to measure the degree of accessibility and referential transparency in RA titles.

More precisely, from a textual viewpoint (level of informativeness), titles can be:

a. Full-sentence titles^{11, 32}, i.e. those titles whose structures are syntactically complete and semantically self-standing (declarative/declaratory; interrogative titles), as in the following examples (our emphasis here and there):

1. *Run for your life* ... at a comfortable speed and not too far.
2. Biology's *bad boy* is back
3. *All you need is love?*

b. Compound titles (informative), i.e. titles whose formulations comprise two parts (phrases, clauses or full sentences), usually separated by a colon or a corresponding punctuation mark³, also called hanging³³ or colonic titles¹⁸. The two parts are logically interconnected, mutually clarifying and organized in theme-rheme sequences, where the first part establishes the given information and the second modifies, specifies, articulates or frames it through the introduction of new informative material. These patterns³⁴ represents the type problem-solution, general-specific, topic-method, and major-minor, all clusters, as can be seen in the following examples:

4. *Here comes the sun*: recognition of UV-damaged DNA.
5. *All together now*. Operational challenges to a practice in an integrated delivery system.

c. Nominal titles, i.e. titles whose formulations contain neither a finite nor a conjugated verb and consist of a single verbless text segment (non-finite verbal forms such as gerunds, participles, to + infinitives):

6. **Getting** around (on four wheels) *with a little help from my friends*.
7. Sphingosine-1-Phosphate as the Lymphocyte's *Ticket* **to Ride** and **Survive**
8. **Fixing** *a hole* where the Ras gets in.
9. *A day in the life*

The analysis carried out at the sentence level helped us to understand how information is packaged. In this case, titles have been classified as:

a. Topic titles, i.e. titles formed with a single nominal group or including a modifying possessive, partitive or relational genitive element, when this qualifies the noun phrase itself rather than modifying its semantic relation to other phrases or cotextual elements, as in the following cases (our emphasis here and there):

10. *The matchbox sign*

11. *The magical mystery tour* **of** health insurance.

12. The similarity **of** life *across the universe*.

b. Bi-head titles⁷, or correlates, are those composed of two noun phrases correlated by the conjunction 'and' (in some cases 'or'), like the examples below:

13. IL-22 **and** inflammation: leikin' through *a glass onion*

14. Some further comments on aseptic processing guidance, **or** *the fool on the hill*: Parenteral Drug Association.

c. Focus titles are those formulations where the noun phrase (i.e. the topic) is followed by a disambiguating post-modifying element (i.e. focus), be it a prepositional phrase or a to + infinitive clause, which further articulates the semantic relationship between the noun phrase and its lexical cotext, as can be seen in the following instances:

15. A "*Yellow Submarine*" **in** Dermoscopy.

16. *A day in the life*: a night **to remember**.

From a lexical perspective, titles can be:

a. titles with specialist lexis (expressions which presuppose and require domain-specific competence on the part of the reader to be recognized):

17. Are **GOLDen** *slumbers* drug induced?

18. *Helter-skelter*-like **perylene polyisocyanopeptides**.

b. titles using "language as mention". This term broadly refers to all those 'markedly non-specialized items' which appear to be borrowed from other (non-specialized) situational contexts or registers, and inserted in the wording of the title for their cognitive impact. This strategy can be realized through the use of metaphors and figurative language, actual quotations (if stylistically marked), or clashing registers. These language-as-mention strategies, which are defined as 'attractors'¹⁷, are possibly intended as popularizing resources³⁵ (i.e. not as the influence of media or popular discourse but as interpretation

facilitating devices for the processing of a text), meant to clarify or help represent the meaning of the title and, as a consequence, of the associated publication.

19. A **"Yellow Submarine"** in Dermoscopy.

20. Here comes the **sun**: medical professionalism and the implications of the sunshine act for gastroenterology practice.

While in (19) there is a clear indication of the mention stylistically marked with inverted commas, in (20) *sun* is a rhetorical trope as it acts as a pun to indicate the SUNSHINE Act issued to provide more transparent relations between physicians and medical devices or pharmaceutical manufacturers.

Clearly, as the analysis is on three different levels, the categories can overlap. Indeed, as can be seen in the examples above, the title *A "Yellow Submarine" in Dermoscopy* is at the same time a nominal, focus title which uses language as mention.

The analysis of titles at the level of informativeness is summarized in Supplementary Tables 5, 6 and 7.

As can be seen, Supplementary Table 5 indicates the degree of informativeness represented in titles. Apparently, data suggest that compound titles (57.32%) and nominal titles (38.09%) are preferred. In the case of compound titles, they are normally formed with the song in the thematic position, followed by a colon, introducing the 'real' title of the contribution which illustrates the topic that is being dealt with by the publication.

The analysis at the sentence level measures the way in which information is packaged. As can be seen in Supplementary Table 6, titles are primarily focus ones (62.08%): the topic of the title, normally the Beatles song title, is followed by the 'real' title acting as a disambiguating post-modifying element, the focus, which creates a semantic bridge between the Beatles song title and the RA co-text.

In supplementary Table 7, we can see the degree of accessibility and referential transparency in RA titles. The classification offered¹ is based on titles containing specialized lexis vs titles containing markedly non-specialized items.

In all the cases represented in Supplementary Table 7, titles are constructed with one Beatles song. Intuitively, the song title introduces the 'real' title which may have specialized language used in the field under investigation. Interestingly, however, 75.64% of titles are constructed with no specialized language; in only 5% of titles does the Beatles song title form what is defined as "language as mention"¹, i.e. 'markedly non-specialized items' which appear to be borrowed from the song itself and stylistically marked with actual quotations. In any case, the presence of a Beatles song title, be it stylistically marked or not, is intended to act as an attractor¹⁷: a popularizing resource meant to clarify or help represent the meaning of the title and, as a consequence, the associated publication.

The level of informativeness has been put in relation to titles' meaning-making. In other words, we have semantically investigated whether the level of informativeness has an autonomous meaning or whether the meaning of the title could be understood only in relation to the research article's content. Indeed, we detected that some titles quote a Beatles song title, as in *Come together*, and apparently do not refer to anything in particular: the meaning of the title can be understood only after reading the publication, which becomes the context creating the semantic reference point via which to understand the title.

In this case, we have divided titles into 'allusive' vs 'informative'. Allusive titles are those quoting a Beatles song title and whose meaning cannot be understood; informative titles are those which offer an explicit meaning (Supplementary Table 8).

Roughly 61% of titles are informative and almost 39% are allusive.

All allusive and informative titles, simply by referring to a Beatles song title, belong to the category defined as "Titles that bid for attention by using startling or effective openings"¹⁷.

Informative titles have thus been further investigated to understand the implied meaning of the part of the title acting as a disambiguating post-modifying element (if analysed as a focus title) or as the rhematic part modifying, articulating, and specifying the Beatles song title (if analysed as a compound title). The categories applied¹⁷ are:

i. announcing titles, that is titles that announce the general topic dealt with within the publication, as in (21) below:

(21) *Ticket to ride*: export of proteins to the *Plasmodium falciparum*-infected erythrocyte.

ii. thematizing titles, that is titles that particularize the theme dealt with in the publication, as in (22):

(22) *It's Been a Hard Day's Night* and *I've Been Working Like a Dog*: Workaholism and Work Engagement in the JD-R Model.

iii. titles posing the controlling research question, as in (23):

(23) *Run for your life*: can exercise be used to effectively target GLUT4 in diabetic cardiac disease?

iv. titles answering the paper's research questions, as in (24);

(24) *A hard day's night*. The harmful effects of shift work.

v. methodological approach titles, that is titles that put emphasis on the methodology applied, as in (25):

(25) *All together now*. experimental multispecies biofilm model systems

vi. titles indicating guidelines or a comparison, as shown in (26), below;

(26) Dietary Intervention for Glucose Tolerance In Teens (*DIG IT*): Protocol of a randomized controlled trial using health coaching to prevent youth-onset type 2 diabetes.

vii. mystifying titles, i.e. titles that attract but do not carry meaning per se, if not linked to the research context, as in (27), below;

(27) Getting around (on four wheels) *with a little help from my friends*.

viii. titles indicating the author's position or direction in a topic, as in (28):

(28) *Here comes the sun*: new policies will bring better times ahead for the nephrology specialty.

Data indicate that titles can be classified as shown in Supplementary Table 9. As can be seen, informative titles forming our corpus are mainly constructed to announce the general subject (48%), particularize the subject (21%) or offer answers to the research questions. Informative titles, therefore, seem to be either *indicative* of the research topic, or *conclusive*, when they anticipate the research results in the title.

Given that both allusive and informative articles may contain a Beatles song title, the latter seems to have an anchorage function³⁶. Every Beatles song title has a meaning in the context of the Beatles song it is linked to. However, when the title is linked to different related texts, it acquires polysemous related meanings. Seen in this way, such possibilities for multiple interpretations are limited when titles and texts are anchored. In the case of allusive titles (be they nominal titles – 185 hits, or topic titles – 190 hits), the meaning is anchored by the relationship existing between the title and the content of the research publication; in the case of informative titles, anchorage is offered by the relation the Beatles song title has to the second part of the RA title, in particular in the case of compound titles (295 hits) and focus titles (315 occurrences).

This is particularly relevant in cases in which:

- the title thus constructed is created by modifying an existing Beatles title, as shown in (29):

(29) *Good Night, Sleep Tight*, Bed Bugs Continue to Bite

where not only the original title “Good Night, Sleep Tight” but also the common-sense “Good Night, Sleep Tight, don't let Bed Bugs Bite” is modified to acquire meaning amplification when connected to the research content. Indeed, the article is not about bugs in mattresses, which may cause difficulties with sleeping, but rather about a completely different medical topic: the case of a child who presented with sleep-related rhythmic movement disorder, diagnosed because he also had attention-deficit issues;

- the function of the title is to offer feedback or comment on a previously published paper, as in (30) below:

'Help! I need somebody': getting timely assistance in clinical practice

which is a comment on a paper entitled “The 'go-between' study: a simulation study comparing the 'Traffic Lights' and 'SBAR' tools as a means of communication between anaesthetic staff”, both of them published in the 71(7) issue of *Anesthesia* in 2015, and thanks to which the article entitled “The 'go-between' study” published a correction in the following issue;

the reference is external to the publication and linked to a new context, as in the following examples:

(31) Come and *get IT*

(32) *Here comes the sun*

(33) *Twist and shout*

(34) *Here Comes the SUN* (Part 2): Standardization of Uveitis Nomenclature for Disease Classification Criteria

Where, in (31), ‘IT’ refers to Information Technology; in (32), ‘sun’ refers to the Sunshine Act regulating the relations between medics and the pharmaceutical industry to make them more transparent; in (33), the title is a comment on an article entitled “Mutations in TWIST, a basic helix-loop-helix transcription factor” and, by creating a pun, refers to the basic helix-loop-helix transcription factor, called TWIST, seen as a candidate for Saethre-Chotzen syndrome; in (34), ‘SUN’ is the acronym for Standardization of Uveitis Nomenclature.

There is, in particular, one case that is worth noting. A 2008 publication entitled *Here comes the sun* created a semantic link the title and the general topic of public health. In 2010, the same link is again dealt with in a slightly modified title, which appears to be longer but also a development of the topic dealt in the 2008 article: the title *Here comes the sun (and the rain, wind and snow)* refers to the study carried out by the author showing the impact climate change has on public health.

Although not frequently used, these strategies are employed in both allusive and informative titles, as can be seen in Supplementary Table 10, which indicates that 18.31% of titles modify the Beatles title, and 2.56% comment on a previous article.

These titles clearly bid for attention by using startling or effective openings.

4. Conclusions

The purpose of this paper has been to understand the reason why Beatles song titles are used as titles for medical research publications. Through a corpus-assisted investigation of journals or disciplines, we have focused on current practices in the creation of medical titles which use a Beatles song title. Indeed, “By analysing how language is used [...] and heightening awareness of its specific and contextually motivated features, applied linguistics has an important role to play in helping scientific researchers participate more effectively in the discourse practices of their field.”³⁷

We have seen that titles which use a Beatles song title are a form of 'language as mention', even though the mention is not stylistically singled out: by quoting a Beatles song title, the author of the publication clearly creates an attention-seeking device with startling effect. Such a strategy does not seem to depend on a particular point in time, a particular journal, or a particular Beatles song title. These titles are puns that create an anchorage, either with the content of the published research, if allusive, or with the second part of the title, if informative. The former titles are nominal titles; they can turn into informative titles if they appear in a personal note section (as in the case of *A day in the life*). The latter titles, if created as compound or focus titles, exploit a startling effect to attract the readership to the second part of the title, which disambiguates or focuses information on a field topic. Informative titles, by announcing a general topic or presenting the research question, are *indicative* in the sense that they indicate the research angle from which the readership must position; by answering the research question, they are *conclusive* in that they anticipate the research results in the title itself. As these titles carry research information, the Beatles element in the title is appealing and entices the reader to stop and read the research.

In all cases, this contributes to reconstructing boundaries in social practices and generating new hybrid promotional genres³⁸, which are exploited to introduce innovations and achieve more communicative purposes.³⁹ Scientific articles attract by informing, and titles have a retrieval function. With these titles, what is important is the surprise value of information rather than information per se.

Declarations

DATA AVAILABILITY

The data set (research article titles containing Beatles' song titles) that support the findings of this study are available in PubMed [<https://pubmed.ncbi.nlm.nih.gov/>]

CODE AVAILABILITY (MANDATORY FOR ARTICLES WITH NEW CUSTOM CODE)

no custom code was used to generate or process the data described in the manuscript

AUTHORS CONTRIBUTION

SM MACI is first author. C DE LORENZO and C VOLLONE are joint last authors. SM MACI conceived, designed, planned, and managed the study, acquired data, interpreted the results, drafted the manuscript, and critically reviewed or revised the manuscript for important intellectual content. C DE LORENZO and C VOLLONE conceived the study, supervised the data analysis, and the interpretation of results. All authors approved the final draft. SM MACI is the guarantor. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

COMPETING INTEREST STATEMENT

All authors have completed the Unified Competing Interest form (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

STATEMENT

The Lead and Corresponding Author has the right to grant on behalf of all on a worldwide basis to Springer-Nature to permit this article (if accepted) to be published in Springer editions and any other Springer products and sublicences such use and exploit all subsidiary rights, as set out in Springer licence

TRANSPARENCY DECLARATION

The Lead and corresponding Author affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

Ethics statements: Not required.

Ethical approval: Not required.

Funding: The authors did not receive support from any organization for the submitted work

References

1. Sala, Michele 2013. Language Change in Legal Research Article Titles. In Poppi, Franca; Cheng, Winnie (eds) *The Three Waves of Globalization: Winds of Change in Professional, Institutional and Academic Genres*, Newcastle upon Tyne: Cambridge Scholars Publishers, 222–243.
2. Giannoni, Davide 2013. Whose Genre Awareness? The Case of Medical Titles. In: Bernadette O'Rourke, Nicola Bermingham, & Sara Brennan (eds.) *Opening New Lines of Communication in Applied Linguistics. Proceedings of the 46th Annual Meeting of the British Association for Applied Linguistics*, 5–7 September 2013, Heriot-Watt University, Edinburgh, 151–159.
3. Sisó, Mercedes Jaime 2009. Titles or Headlines? Anticipating Conclusions in Biomedical Research Article Titles as a Persuasive Journalistic Strategy to Attract Busy Readers. In *Miscelànea* 39: 29–54.
4. White, Arden and Nelda Hernandez. 1991. Increasing Field Complexity Revealed through Article Title Analyses. *Journal of the American Society for Information Science* 42: 731–734.
5. Yitzhaki, M. 1997. Variation in informativity of titles of research papers in selected humanities journals: A comparative study. *Scientometrics* 38, 219–229.
6. Lewison, Grant; Hartley, James 2005. What's in a Title? Numbers of Words and the Presence of Colons. In *Scientometrics*, 63 (2): 341–356.

7. Wang, Yan and Yongquan Bai. 2007. A Corpus-based Syntactic Study of Medical Research Article Titles. *Syntax* 35 (3): 388–399.
8. Soler Viviana 2011. Comparative and Contrastive Observations on Scientific Titles Written in English and Spanish. In *English for Specific Purposes*, 30 (2): 124–137.
9. Jacques, Thomas S.; Sebire, Neil J. (2010). The Impact of Article Titles on Citation Hits: An Analysis of General and Specialist Medical Journals. In *Journal of the Royal Society of Medicine Short Reports*, 1 (2): 1–5.
10. Swales, John M. 2003. *Genre Analysis: English in Academic and Research Settings*. Shanghai: Shanghai Foreign Language Education Press.
11. Haggan, Madeline 2004. Research Paper Titles in Literature, Linguistics and Science: Dimensions of Attraction. In *Journal of Pragmatics* 36(2): 293–317.
12. Heurley, Laurent. 1994. *Traitement de textes procéduraux. Etude de psycholinguistique cognitive des processus de éproduction et de compréhension chez des adultes non-experts*. diss., Universit de Bourgogne.
13. Ganier, Franck. 1999. *Le traitement cognitif: déterminant de la conception de documents procéduraux*. PhD diss., Université de Bourgogne.
14. Fox, Charles W.; Burns, C. Sean. 2015. The relationship between manuscript title structure and success: editorial decisions and citation performance for an ecological journal. *Ecology and Evolution* 5 (10): 1970–1980.
15. Paiva, Carlo Eduardo; da Silveira Nogueira Lima, João Paulo; Sakamoto, Bianca Ribeiro Paiva 2012. Articles with Short Titles Describing the Results Are Cited More Often. In *Clinics*, 67 (5): 509–513.
16. Hudson, J. 2016. An analysis of the titles of papers submitted to the UK REF in 2014: authors, disciplines, and stylistic details. *Scientometrics* 109: 871–889.
17. Hartley, James. 2005a. “To Attract or to Inform: What Are Titles for?” *Journal of Technical Writing and Communication* 35 (2): 203–213.
18. Hartley, James. 2005b. Improving That Title: The Effects of Colons. *European Science Editing* 31: 45–47.
19. Smith Richard 2000. Informative Titles in the BMJ. In *British Medical Journal*, 320 (7239): 915.
20. Whissell, Cynthia. 1999. Linguistic Complexity of Abstracts and Titles in Highly Cited Journals. *Perceptual and Motor Skills* 88: 76–86.
21. Sala, Michele; Consonni, Stefania 2019. Titles in Medicine and Science Popularization. In: Bondi, Marina; Cacchiani, Silvia; Cavalieri, Silvia (eds.) *Communicating Specialized Knowledge: Old Genres and New Media*, Newcastle upon Tyne: Cambridge Scholars Publishers, 16–32.
22. Wilson, Logan. 1942. *The Academic Man: A Study in the Sociology of a Profession*. New York: Oxford University Press.

23. Callaham, Michael / Wears, Robert L. / Weber, Ellen. 2010. Journal prestige, publication bias, and other characteristics associated with citation of published studies in peer-reviewed journals. *JAMA* 287 (21): 2847–2850.
24. Mavrogenis, Andreas F.; Panagopoulos, Georgios N.; Megaloikonomos, Panayiotis D.; Panagopoulos, Vassilis N.; Mauffrey, Cyril; Quaile, Andrew; Scarlat, Marius M. 2018. Scientific misconduct (fraud) in medical writing. *Orthopedics*. 41 (2): e176–e183
25. Wheatley, Danys. 2018. Writing Scientific and medical papers clearly. *The Anatomical Record*. Available at: <https://onlinelibrary.wiley.com/doi/abs/10.1002/ar.23860>
26. Rijkers Ger T. 2017. Tell Me Why Bob Dylan and the Beatles Song Titles Are Used in Biomedical Literature. *Webology*, 14 (2): 78–89. Available at: <http://www.webology.org/2017/v14n2/a159.pdf>
27. Gornitzki, C., Larsson, A., Fadeel B. 2015. Freewheelin' scientists: citing Bob Dylan in the biomedical literature. *British Medical Journal*, 351: h6505
28. Brown S, Aplin KL, Jenkins K, et al. Is there a rhythm of the rain? An analysis of weather in popular music. *Weather*. 2015;70, 198-204.
29. Hartley, James. 2007. Planning That Title: Practices and Preferences for Titles with Colons in Academic Disciplines. *Library and Information Science Research* 29: 553–568.
30. Eyrolle H, Virbel J, Lemarié J. Effects of Incomplete Correspondence between Document Titles and Texts on Users' Representations: A Cognitive and Linguistic Analysis Based on 25 Technical Documents. *Applied Ergonomics*. 2008;39:241-246
31. Fortanet, Inmaculada; Posteguillo, Santiago; Coll, Juan F.; and Palmer, Juan C. 1998. Linguistic Analysis of Research Article Titles: Disciplinary Variations. In *Perspectivas Pragmáticas en Lingüística Aplicada*, Vázquez, Ignacio and Guillén, Ignacio (eds), Zaragoza: Anubar, 443–447.
32. Soler Viviana 2007. Writing Titles in Science: An Exploratory Study. In *English for Specific Purposes*, 26 (1): 90–102.
33. Day, Robert A. 1994. *How to Write and Publish a Scientific Paper*. Cambridge: Cambridge University Press.
34. Swales, John and Christine Feak. 1994. *Academic Writing for Graduate Students*. Ann Arbor: The University of Michigan Press.
35. Dubois, Betty Lou. 1985. Popularization at the Highest Level: Poster Sessions at Biomedical Meetings. *International Journal of the Sociology of Language* 56: 67–84
36. Barthes, Roland. *Elements of Semiology*. (1968). Hill and Wang, New York.
37. Rowley-Jolivet, Elizabeth; Carter-Thomas, Shirley 2005. The Rhetoric of Conference Presentation Introductions: Context, Argument and Interaction. In *International Journal of Applied Linguistics* 15 (1): 45–70.
38. Fairclough Norman. 1993. Critical Discourse Analysis and the Marketization of Public Discourse: The Universities. *Discourse & Society* 4(2): 133–168.

39. Bhatia, Vijay. 1997. Genre-Mixing in Academic Introductions. *English for Specific Purposes* 16 (3): 181–195

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Tables.docx](#)
- [FIGURE.docx](#)