The Risks of Using ChatGPT to Co-Write Your Scientific Paper

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Research Support Services
Medical Library

Thursday
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13:00, Zoom
ChatGPT is a conversational-AI tool

- **ChatGPT** stands for **Chat**bot **Generative Pretrained Transformer**
- Released by OpenAI in November 2022
- What’s gone into it?
  - “Black box” algorithms and unknown training data
  - Data set limited to September 2021: **Not up to date**
  - Open access text: **articles behind paywalls**?
- How do you use it? **Prompt engineering**
  - Your inputs, feedback, comments are extremely valuable to OpenAI (& Microsoft)
- What does it produce?
  - Generic, coherent, grammatical text
  - “Hallucinations”
Is your data secure?

No!

Any information you share is no longer confidential.
Using GPT-4 (ChatGPT Plus) for scientific writing

"[GPT-4 is] 40% more likely to produce factual responses than GPT-3.5 on our internal evaluations"
Can ChatGPT be used for literature search?

Cannabis, also known as marijuana, has been increasingly recognized for its potential in managing side effects related to chemotherapy. The active compounds in cannabis, called cannabinoids, include delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD). Both THC and CBD have shown promise in alleviating symptoms associated with chemotherapy, such as nausea, vomiting, and pain.

1. Nausea and vomiting: Chemotherapy-induced nausea and vomiting (CINV) is a common and distressing side effect of cancer treatment. The American Society of Clinical Oncology (ASCO) and the National Comprehensive Cancer Network (NCCN) recommend the use of cannabinoids, such as dronabinol (synthetic THC) and nabilone (a synthetic cannabinoid), as an alternative or additional option to standard antiemetic drugs for patients who do not respond well to conventional medications (ASCO, 2017; NCCN, 2021).

2. Pain management: Cancer-related pain can be difficult to manage, especially in patients with advanced cancer or those who have developed a tolerance to opioids. Some studies have shown that cannabis and cannabinoids can help alleviate cancer-related pain by working on the body’s endocannabinoid system. A systematic review published in the Journal of Pain and Symptom Management (2017) found that cannabis-based medicines may be effective in reducing chronic cancer pain compared to placebo.

3. Appetite stimulation: Chemotherapy can lead to a decreased appetite and weight loss in cancer patients. Dronabinol and nabilone, both synthetic cannabinoids, have been approved by the US Food and Drug Administration (FDA) for the treatment of anorexia and weight loss in patients with AIDS. While not specifically approved for cancer patients, these medications may also help stimulate appetite in those undergoing chemotherapy.

4. Anxiety and sleep: Some patients undergoing chemotherapy may experience anxiety and sleep disturbances. CBD, a non-psychoactive cannabinoid, has been shown to have anxiolytic and sleep-enhancing properties in some studies, potentially benefiting patients who struggle with these symptoms during treatment.

It is essential to consult a healthcare professional before looking for managing chemotherapy side effects, as there can be contraindications. Additionally, cannabis products are not standardized, and the quality and potency can vary greatly. Patients should only use cannabis products obtained from a reliable source and under the guidance of a healthcare provider.
Can ChatGPT be used for literature search?

- Misinterpreted the treatment guidelines (refs #1 and #2)
- Refs #3 and #4 not cited in the summary
- Refs #3 and #4 contradict summary
- Citation in text “hallucinated”
- US-centric sources listed
- Recent evidence does not support summary
Can ChatGPT be used for literature search?

No!

- Text contains factual errors
- Sources not up to date
- Not efficient

Advice:

- Interact with your literature: understand the discourse and context, evaluate the knowledge gap, develop arguments
  - Essential for writing the narrative sections of the paper
  - Networking and communicating as academics (think beyond publishing)
Can ChatGPT be used to revise a draft?

Introduction section

Problems with the Introduction
- Problems at the section level:
  - What’s the focus of the paper? ASD? GI problems? Gut microbiota imbalance?
- Problems at the paragraph level:
  - No topic sentences
  - 1 paragraph with 3 topics that need to be dealt with separately
  - Haphazard organization
- Problems at the sentence level:
  - Difficult to follow due to bad structure
Can ChatGPT be used to revise a draft?

Introduction section

Prompt: You are an expert scientific writer and editor. I give you the Introduction section of a scientific paper. You will copyedit it and rewrite it according to the AMA Style Guide. Make it concise, clear, grammatically correct, readable, logical, and suitable for the Introduction section of a scientific article. Here's the text for you to rewrite:

Can ChatGPT be used to revise a draft?
Introduction section

Can ChatGPT be used to revise a draft?

Autism spectrum disorder (ASD) is a complex neurodevelopmental disorder with early onset and diverse etiology\(^1\). The prevalence of ASD has steadily risen, potentially due to increased awareness, diagnostic accessibility, and evolving criteria. Recent research has also linked environmental factors to ASD, helping explain this surge in prevalence\(2,3\). ASD affects 0.6\%–1.7\% of children and adolescents, constituting a significant public health issue, with males up to 4 times more likely to be diagnosed than females\(4–6\).

The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5)\(^7\) identifies persistent deficits in social communication and interaction, along with restrictive, repetitive behavior patterns, interests, or activities in affected individuals. ASD is also associated with comorbidities such as intellectual disability, gastrointestinal (GI) issues, and eating and sleeping disorders\(9–10\). GI symptoms, including constipation, abdominal pain, diarrhea, gas, and vomiting, are more prevalent in people with ASD (9\%–90\%) compared to neurotypical individuals\(9\). Studies suggest a correlation between GI symptoms and ASD severity\(9,11,12\).

Current research posits that the gut microbiota influences brain development and function via the endocrine, immune, and nervous systems, forming the "gut-brain microbiota axis"\(13\). Alterations in gut microbiota could contribute to both GI and neuropsychiatric symptoms in autistic children\(13,14\). Some clinical studies have found dysbiosis in the type and abundance of gut bacteria in autistic subjects compared to neurotypical controls\(15–19\), while others have not\(20,21\). A previous meta-analysis\(22\) indicated an association between ASD and microbiota composition, emphasizing the need for further cohort studies.

Evaluating intestinal microbiota may inform personalized microbiological interventions as complementary treatments for ASD. Some clinical trials and animal studies have reported improvements in neurological function, behavior, and comorbid symptoms after modulating gut microbiota composition using antibiotics, prebiotics, probiotics, or fecal microbiota transplantation\(22–25\).

This systematic review and meta-analysis aims to update current knowledge on gut microbiota composition in children and adolescents with ASD and compare it to neurotypical peers. By characterizing individual gut bacterial profiles, we may enhance nutritional interventions and improve quality of life for those with ASD.
Can ChatGPT be used to revise a draft?

Introduction section

ChatGPT Plus version is still difficult to read

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<th>Original</th>
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<td>13</td>
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</table>

Data from Hemingway Editor. Available at [https://hemingwayapp.com/](https://hemingwayapp.com/)

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Autism spectrum disorder (ASD) is a complex neurodevelopmental disorder with early onset and diverse etiology. The prevalence of ASD has steadily risen, potentially due to increased awareness, diagnostic accessibility, and evolving criteria. Recent research has also linked environmental factors to ASD, helping explain this surge in prevalence [2,3]. ASD affects 0.6%–1.7% of children and adolescents, constituting a significant public health issue, with males up to 4 times more likely to be diagnosed than females [4–6].

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Current research posits that the gut microbiota influences brain development and function via the endocrine, immune, and nervous systems, forming the “gut-brain microbiota axis” [13]. Alterations in gut microbiota could contribute to both GI and neuropsychiatric symptoms in autistic children [13,14]. Some clinical studies have found dysbiosis in the type and abundance of gut bacteria in autistic subjects compared to neurotypical controls [15–19], while others have not [20,21]. A previous meta-analysis [22] indicated an association between ASD and microbiota composition, emphasizing the need for further cohort studies.

Evaluating intestinal microbiota may inform personalized microbiological interventions as complementary treatments for ASD. Some clinical trials and animal studies have reported improvements in neurological function, behavior, and comorbid symptoms after modulating gut microbiota composition using antibiotics, prebiotics, probiotics, or fecal microbiota transplantation [22–25].

This systematic review and meta-analysis aims to highlight current knowledge on gut microbiota composition in children and adolescents with ASD and compare it to neurotypical peers. By characterizing individual gut bacterial profiles, we may enhance nutritional interventions and improve quality of life for those with ASD.
Can ChatGPT be used to revise a draft?

ChatGPT Plus version is not better prose

<table>
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<th>ChatGPT Plus</th>
<th>Outcome</th>
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<td>9% 😞</td>
<td>Bad made worse</td>
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<td>13% 😞</td>
<td>Better</td>
</tr>
<tr>
<td>Ad-words (adverbs, adjectives)</td>
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<td>10% 😞</td>
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<td>It, this, that, there</td>
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<td>Similar</td>
</tr>
</tbody>
</table>

Data from Writer’s Diet Test. Available at [https://writersdiet.com/writing-test/](https://writersdiet.com/writing-test/)

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Can ChatGPT be used to revise a draft?
Yes, but mostly no

- ChatGPT is good for cosmetic changes, but barely
- It cannot automatically address the bigger issues:
  - Focused point of view: message of the paper, setting up the context
  - Logical organization and internal structure of paragraphs
  - Consistent, concrete, and inclusive terminology
- First-time writers will first need to be trained in scientific writing to be able to judge the quality of the output
- Experienced writers will need to learn how to coach ChatGPT
- Meticulous editing will still be required
Can ChatGPT be listed as an author?

No!

- ChatGPT cannot fulfill all the International Committee of Medical Journal Editors (ICMJE) authorship criteria
- World Association of Medical Editors (WAME) recommendations: Authors must take full responsibility for all the content (provenance, attribution, accuracy, completeness)
- Committee on Publication Ethics (COPE) position statement: AI tools are non-legal entities; they cannot attest to a conflict of interest, cannot understand copyright or licensing
- Journal-specific guidelines:
  - Science: Text from generative-AI CANNOT be used. Other outputs only with permission from editors.
  - Springer-Nature: Include details in the Methods section or suitable alternative section
  - Taylor & Francis: AI tools must be acknowledged and documented
  - Elsevier: AI tools should only be used to improve readability and language; their use should be disclosed in the manuscript
  - JAMA Network: Include a description of the content that was created or edited and the name of the language model or tool, version and extension numbers, and manufacturer, in the Acknowledgements or Methods section (as appropriate)
Authors should specify:
1. who used the system,
2. the time and date of the use,
3. the prompt(s) used to generate the text,
4. the sections(s) containing the text; and/or
5. ideas in the paper resulting from NLP use.

Submit generated text as supplementary material.
Include disclosure statement, eg in Methods.

“In writing this manuscript, S.R. used OpenAI Chatbot [GPT model] on 27th of March 2023 at 1:21pm CEST. The following prompt was used to write the Introduction: ‘Write a 300-word piece about the use of cannabis in managing side effects of chemotherapy.’ The generated text was copied verbatim and is submitted as supplementary material.”

AI-detection software available and under development.
Remember...

Informed User • Intelligent User • Cautious User

- As an author, you are responsible and accountable for EVERYTHING
  - ChatGPT makes up stuff, even GPT-4
  - Fact-checking takes a lot of time
  - Content is shallow (no insight, original interpretation)
  - Human (expert) editing is still needed
  - Take careful notes and disclose use when publishing

- Writing is hard but the best way to learn your subject

- You are sharing information with an opaque, for-profit company

[Microsoft lays off an ethical AI team as it doubles down on OpenAI](https://techcrunch.com/2023/03/13/microsoft-lays-off-an-ethical-ai-team-as-it-doubles-down-on-openai/). Accessed 27.04.2023
Resource: authorship guidelines

- WAME recommendations: https://wame.org/page3.php?id=106
- COPE position statement: https://publicationethics.org/cope-position-statements/ai-author
- Journal-specific guidelines
  - Science: https://www.science.org/content/page/science-journals-editorial-policies
  - Springer-Nature: https://www.nature.com/nature/for-authors/initial-submission
  - Elsevier: https://www.elsevier.com/about/policies/publishing-ethics
    - Search for “AI tools FAQs” on Elsevier’s website, https://www.elsevier.com/
  - JAMA Network: Updates reported in an editorial, https://jamanetwork.com/journals/jama/fullarticle/2801170
Thanks for your attention.

Next Coffee Lectures

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Thanks for your attention.
Thanks for your attention

Please get in touch
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Questions & Discussion

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