# Writing exercise 09: Word Choice

## Dr. Morgan Feeney, AY 2024-25

### Excerpts from Orwell’s Six Rules for Writing:

* Never use a metaphor, simile, or other figure of speech which you are used to seeing in print.
* Never use a long word where a short one will do.
* Never use a foreign phrase, a scientific word, or a jargon word if you can think of an everyday English equivalent.

### See also Strunk & White: Words and Expressions Commonly Misused [4th ed., pgs. 39-65]

### Additional word choice tips:

* Make sure you are choosing the correct word; pay especial attention to commonly confused words and homophones: e.g., affect/effect, their/there.
* Avoid neologisms (coining new expressions) or redefining known words to give them non-standard meanings.
* Avoid unnecessarily long words (e.g. “use” is shorter and more impactful than “utilise”).
* Do not vary words just for the sake of variety – there is no need to sound as though you’ve swallowed a thesaurus.

### Selected examples1:

"In the microbial milieu, the antibiotic acts as a double-edged sword, slicing through bacterial populations while simultaneously fostering the emergence of resistant strains, akin to a gardener who unwittingly cultivates weeds while trimming the hedges."

"The scientists systematically undertook the quantification of the microorganism's proliferative capacity, employing a sophisticated array of methodologies to elucidate the multifactorial dynamics underpinning its exponential growth."

"The examination revealed that the quorum sensing mechanism of Pseudomonas aeruginosa was markedly upregulated in the presence of autoinducer molecules, leading to a de facto enhancement of its biofilm formation capabilities, a quintessential example of microbial cooperation under selective pressure."

"The experiment's data effected the conclusion that the bacterial strain’s tolerance to environmental stressors was significantly higher, therefore suggesting their survivability is not likely to be compromised under adverse conditions."

"The concept of 'bacterio-genesis' as I define it in this study, refers specifically to the birth and development of new bacterial species through horizontal gene transfer, a process which has been insufficiently explored in the existing literature."

"The pathogen demonstrated resistance to the antibiotic, displayed resilience in hostile environments, and manifested an ability to withstand immune system attacks, indicating a robust survival mechanism."

### Exercise 9A.

Read each example and consider if/how the authors’ word choices can be improved. (Keep in mind the principles we have discussed in previous exercises.)

**Sample 9.1** 1

Earth’s biosphere and all lives within are being threatened by an unprecedented accumulation of synthetic materials of anthropogenic origin, commonly known as plastics (1–3). In the US, plastics make up about 12% of municipal solid waste (4). The global production of petroleum-based plastics reached 391 MMt/a in 2021; projected to grow exponentially for the foreseeable future, it will soon surpass a volume of half a gigaton per year (5). Currently, the US’ plastics industry alone accounts for 3.2 quadrillion BTU (quads) of annual energy use, resulting in over 100 Mmt CO2e/a of greenhouse gas (GHG) emissions (2).

Both, the contribution to global warming from the production of synthetic materials and the contamination of the biosphere at their end-of-life, have aggravated environmental problems with consequences on a global scale: the damage inflicted on the economy likely exceeds the revenue generated by the plastics manufacturing industry (6, 7). Therefore, renewable and readily deconstructable materials are urgently needed. Hence, efforts to recycle and reuse waste streams into renewable materials are being boosted. This includes the upcycling of spent plastics and/or their synthesis from GHGs. Complementing catalytic methods, many approaches now rely upon biotechnology, employing a variety of plants, algae, fungi, or microorganisms (8–13).

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| Word choice improvements? |

**Sample 9.2** 2

Mercury is an omnipresent metal found naturally on the Earth’s crust at a low concentration (nearly 0.5 µg/ml) (Yang et al. 2020). The existence of Hg on the Earth’s surface is due to physical weathering, volcanic eruptions, excavation of mining sites, and the release of factory emissions (Li et al. 2020). Mercury can be found in nature in various forms, such as metallic or vapor (Hg0), mercurous (Hg+ 2) or mercuric (Hg+ 3) compounds, as well as in several organic Hg complexes like methyl, ethyl, or phenyl mercury (Balachandran et al. 2023). Chronic exposure to Hg can cause several non-specific symptoms such as weakness, fatigue, anorexia, weight loss, and stomach problems (Titan et al. 2023). In Japan, during the 1950s, there were reports of several individuals suffering severe neurological distress after consumption of contaminated seafood in industrial areas due to methyl mercury (CH3Hg) intoxication (Saito et al. 2020). They have been shown to interrupt metabolic pathways in organisms and cause substantial damage to human health, especially to the nervous system, muscles, kidneys, small intestine, and reproductive organs in the human body (Pratush et al. 2018).

The microbial population, soil fertility, and plant physiology in the vicinity of a tannery are adversely affected by the steady rise in Hg in the environment (Zheng et al. 2022; Du et al. 2023). Although most bacteria are extremely sensitive to Hg in both soil and water, some subsequently develop strategies to detoxify or attenuate metal toxicity. The development of microbial resistance to high Hg concentrations could result from several mechanisms, including the bacterial surface accumulation of Hg, enzymatic reduction, chelation, and efflux pump via the ATP-Binding Cassette (ABC) transporter (Acharyya et al. 2021). Conventionally, several physical techniques (ion exchange chromatography, evaporation, and precipitation) along with chemical treatments (electrolysis and sorption) are available, which help in the reduction of toxic metals such as Hg from tannery effluents (Rani et al. 2022). However, the main limitation of these treatments is however, the high cost associated with performing these operations (Sundarraj et al. 2022). Therefore, bacterial-mediated bioremediation could be an alternative strategy to combat the hazardous effects of tannery effluents by minimizing Hg-induced toxicity. Several studies have reported the use of *Citrobacter freundii* as an agent to remediate chromium (Cr), copper (Cu), lead (Pb), and even in the degradation of engine oils (Divyasree et al. 2014; Ibrahim et al. 2016).

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| Word choice improvements? |

**Sample 9.3** 2

Many bacterial pathogens secrete diverse protein toxins to disrupt host defense systems, which are expressed with precise spatiotemporal regulation, since untimely toxin secretion can be detrimental to the invading pathogens ([1](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib1), [2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib2)). Such is the case with *Vibrio cholerae*, the major causative agent of the severe diarrheal disease, cholera. In this organism, the expression of various enteric exotoxins is under exquisite control of distinct transcriptional regulators that trigger their expression upon attachment to the small intestine epithelium surface, enabling efficient colonization ([3](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib3)). Cholera toxin (CT), the major virulence factor responsible for cholera pathogenesis, and other accessory toxins and virulence factors (*e.g.*, Ace, Zot, TCP) are primarily regulated by the transcriptional activator ToxT ([4](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib4)). Beyond ToxT-activated genes, pathogenic strains of *V. cholerae* produce several additional accessory toxins ([2](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib2)) such as the extracellular pore-forming toxin hemolysin (HlyA) ([5](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib5)), which is implicated in pathogenesis, particularly, in those strains that lack CT ([6](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib6)). *hlyA* is activated by HlyU and repressed by the quorum-sensing regulator HapR and the iron uptake repressor Fur ([7](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib7)). While HapR and Fur link quorum sensing ([8](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib8)) and the cellular iron status ([9](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib9)) to virulence gene regulation, which is likely advantageous in the human host, the signals that modulate HlyU-dependent activation of HlyA in *V. cholerae* and other exotoxins in other *Vibrio species* remain unresolved ([10](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib10), [11](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib11), [12](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib12), [13](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib13), [14](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib14)). Here, we present a biochemical and functional characterization of HlyU-mediated responses toward microenvironmental signals thought to be present in the gut that may impact hemolysin expression of *V*. *cholerae* and other exotoxins in pathogenic *Vibrio* species ([11](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib11), [12](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib12), [13](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib13), [15](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10509353/#bib15)).

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| Word choice improvements? |

### Exercise 9B.

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Look at your introduction thus far (or any other piece of writing). Go through it, and examine your word choices. Consider how your writing can be improved and make the appropriate edits.

### References

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2. Mukherjee, Kushal et al. “Isolation and characterization of mercury and multidrug-resistant *Citrobacter freundii* strains from tannery effluents in Kolkata, India.” *Archives of microbiology* vol. 206,8 362. 27 Jul. 2024, doi:10.1007/s00203-024-04090-5
3. Diez, C. M. P., Antelo, G. T., Dalia, T. N., Dalia, A. B., Giedroc, D. P., & Capdevila, D. A. (2023). Increased intracellular persulfide levels attenuate HlyU-mediated hemolysin transcriptional activation in Vibrio cholerae. *Journal of Biological Chemistry*, *299*(9), 105147. https://doi.org/10.1016/j.jbc.2023.105147