A Manuscript Microscope 'Sentence Audit' of:

Mechanosensory input shapes Drosophila motor behavior through Patterned Spontaneous Network Activity

What is the Manuscript Microscope Sentence Audit?

The Manuscript Microscope Sentence Audit is a research paper introspection system that parses the text of your manuscript into minimal sentence components for faster, more accurate, enhanced proofreading.

Why use a Sentence Audit to proofread your manuscript?

- Accelerated Proofreading: Examine long technical texts in a fraction of the usual time.
- Superior Proofreading: Detect subtle errors that are invisible to traditional methods.
- Focused Proofreading: Inspect each individual sentence component in isolation.
- Reliable Proofreading: Ensure every single word of your manuscript is correct.
- Easier Proofreading: Take the hardship out of crafting academic papers.

Bonus 1: Improved Productivity: Rapidly refine rough drafts to polished papers.
Bonus 2: Improved Authorship: Cultivate a clear, concise, consistent, writing style.
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Manuscript Source: https://www.biorxiv.org/content/10.1101/2021.03.21.436277v1

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Audit Date: 31/03/21 **Audit Identifier:** K252M08OYF3GV7L **Code Version:** 3.6

Features of the Sentence Audit:

The Sentence Audit combines two complementary proofreading approaches:

1. Each sentence of your text is parsed and displayed in isolation for focused inspection.
2. Each individual sentence is further parsed into Minimal Sentence Components for a deeper review of the clarity, composition and consistency of the language you used.

The Minimal Sentence Components shown are the smallest coherent elements of each sentence of your text as derived from it's conjunctions, prepositions and selected punctuation symbols (i.e. commas, semicolons, round and square brackets).

The combined approaches ensure easier, faster, more effective proofreading.

Comments and Caveats:

• The sentence parsing is achieved using a prototype natural language processing pipeline written in Python and may include occasional errors in sentence segmentation.

• Depending on the source of the input text, the Sentence Audit may contain occasional html artefacts that are parsed as sentences (E.g. "Download figure. Open in new tab").

• Always consult the original research paper as the true reference source for the text.

Contact Information:

To get a Manuscript Microscope Sentence Audit of any other research paper, simply forward any copy of the text to John.James@OxfordResearchServices.com.

All queries, feedback or suggestions are also very welcome.

Research Paper Sections:

The sections of the research paper input text parsed in this audit.

Section No.	Headings	Sentences
Section: 1	Summary	17
Section: 2	Results	10
N/A	--- --- --- --- --- --- ---	0
N/A	--- --- --- --- --- --- ---	0
N/A	--- --- --- --- --- --- ---	0
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The Sentence Audit Of The Research Paper

Title **Mechanosensory input shapes Drosophila motor behavior through Patterned Spontaneous Network Activity**

S1 [001] Summary

S1 [002] Neural activity sculpts circuit wiring in many animals.

Neural activity sculpts circuit wiring ...

... in many animals.

S1 [003] In vertebrates, patterned spontaneous network activity (PaSNA) generates sensory maps and establishes local circuits 1–3.

In vertebrates, ...

... patterned spontaneous network activity ...

... (PaSNA) ...

... generates sensory maps ...

... and establishes local circuits 1–3.

S1 [004] However, it remains unclear how PaSNA might shape neuronal circuits and behavior in invertebrates.

However, ...

... it remains unclear how PaSNA ...

... might shape neuronal circuits ...

... and behavior ...

... in invertebrates.

S1 [005] Previous work in the developing Drosophila embryo discovered spontaneous muscle activity that did not require synaptic transmission, and hence was myogenic, preceding PaSNA 4–6.

Previous work ...

... in the developing Drosophila embryo discovered spontaneous muscle activity ...

... that did not require synaptic transmission, ...

... and hence was myogenic, ...

... preceding PaSNA 4–6.

S1 [006] These studies, however, monitored muscle movement, not neural activity, and were therefore unable to observe how myogenic activity might relate to subsequent neural network engagement.

These studies, ...

... however, ...

... monitored muscle movement, ...

... not neural activity, ...

... and were therefore unable ...

... to observe how myogenic activity ...

... might relate ...

... to subsequent neural network engagement.

S1 [007] Here we use calcium imaging to directly record neural activity and characterize the emergence of PaSNA.

Here we use calcium imaging ...
... to directly record neural activity ...
... and characterize the emergence ...
... of PaSNA.

S1 [008] We demonstrate that the spatiotemporal properties of PaSNA are highly stereotyped across embryos, arguing for genetic programming.

We demonstrate ...
... that the spatiotemporal properties ...
... of PaSNA are highly stereotyped ...
... across embryos, ...
... arguing ...
... for genetic programming.

S1 [009] Consistent with previous observations, we observe neural activity well before it becomes patterned, initially emerging during the myogenic stage.

Consistent ...
... with previous observations, ...
... we observe neural activity well ...
... before it becomes patterned, ...
... initially emerging ...
... during the myogenic stage.

S1 [010] Remarkably, inhibition of mechanosensory input results in excessive PaSNA, demonstrating that muscle movement serves as a brake.

Remarkably, ...
... inhibition ...
... of mechanosensory input results ...
... in excessive PaSNA, ...
... demonstrating ...
... that muscle movement serves ...
... as a brake.

S1 [011] Finally, using an optogenetic strategy to selectively disrupt mechanosensory inputs during PaSNA, followed by quantitative modeling of larval behavior, we demonstrate that mechanosensory modulation during development is required for proper larval foraging.

Finally, ...
... using an optogenetic strategy ...
... to selectively disrupt mechanosensory inputs ...
... during PaSNA, ...
... followed by quantitative modeling ...
... of larval behavior, ...
... we demonstrate ...
... that mechanosensory modulation ...
... during development is required ...

... for proper larval foraging.

S1 [012] This work thus provides a foundation for using the Drosophila embryo to study the role of PaSNA in circuit formation, provides mechanistic insight into how PaSNA is entrained by motor activity, and demonstrates that spontaneous network activity is essential for locomotor behavior.

This work thus provides a foundation ...
... for ...
... using the Drosophila embryo ...
... to study the role ...
... of PaSNA ...
... in circuit formation, ...
... provides mechanistic insight ...
... into how PaSNA is entrained ...
... by motor activity, ...
... and demonstrates ...
... that spontaneous network activity is essential ...
... for locomotor behavior.

S1 [013] These studies argue that sensory feedback during the earliest stages of circuit formation can sculpt locomotor behaviors through innate motor learning.

These studies argue ...
... that sensory feedback ...
... during the earliest stages ...
... of circuit formation can sculpt locomotor behaviors ...
... through innate motor learning.

S1 [014] Highlights

Highlights

S1 [015] PaSNA in the Drosophila embryonic CNS is spatiotemporally stereotyped

PaSNA ...
... in the Drosophila embryonic CNS is spatiotemporally stereotyped

S1 [016] Mechanosensory neurons negatively modulate PaSNA

Mechanosensory neurons negatively modulate PaSNA

S1 [017] Embryonic PaSNA is required for larval locomotor behavior

Embryonic PaSNA is required ...
... for larval locomotor behavior

S2 [018] Results

S2 [019] PaSNA in the Drosophila embryo

PaSNA ...
... in the Drosophila embryo

S2 [020] Motor movements begin in the embryo as uncoordinated twitching at stage 16, followed by larger scale movements that progressively become stronger and more organized prior to hatching approximately 5 hours later (Figure 1A).

Motor movements begin ...
... in the embryo ...
... as uncoordinated twitching ...
... at stage 16, ...
... followed by larger scale movements ...
... that progressively become stronger ...
... and more organized ...
... prior to hatching approximately 5 hours later ...
... (Figure 1A).

S2 [021] To characterize the emergence of neural activity across these stages, as well as to make comparisons between animals, and to facilitate rapid screening of neural and molecular perturbations, we developed a wide-field imaging preparation in which we could monitor neural activity in 20-30 embryos simultaneously (Figure 1B; Methods).

To characterize the emergence ...
... of neural activity ...
... across these stages, ...
... as well ...
... as to make comparisons ...
... between animals, ...
... and to facilitate rapid screening ...
... of neural ...
... and molecular perturbations, ...
... we developed a wide-field imaging preparation ...
... in which we could monitor neural activity ...
... in 20-30 embryos simultaneously ...
... (Figure 1B; ...
... Methods).

S2 [022] We expressed the genetically encoded calcium indicator GCaMP6s in all neurons, while co-expressing nuclear tdTomato to allow for ratiometric imaging, and acquired images every 7 seconds from the myogenic stage through hatching (Video S1A, B).

We expressed the genetically encoded calcium indicator GCaMP6s ...
... in all neurons, ...
... while co-expressing nuclear tdTomato ...
... to allow ...
... for ratiometric imaging, ...
... and acquired images every 7 seconds ...
... from the myogenic stage ...
... through hatching ...
... (Video S1A, ...
... B).

End of Sample Audit

This is a truncated Manuscript Microscope Sample Audit.

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