International Journal of Science Academic Research
Vol. 07, Issue 06, pp.1031-1035, June 2026
Available online at http://www.scienceijsar.com
ISSN: 2582-6425

Research Article

PREFRONTAL EEG OSCILLATORY PROFILES DURING WORDLE: A STUDY OF BRAINWAVE DYNAMICS DURING DIGITAL WORD PUZZLE SOLVING IN STUDENTS

[1, 2, *]Neil Shaw

[1]Head of Sciences, NUCB International College, 4-4 Sagamine, Komenokicho, Nisshin, Aichi 470-0193, Japan
[2]Department of International Studies, Nagoya University of Commerce & Business, 4-4 Sagamine, Komenokicho, Nisshin, Aichi 470-0193, Japan

Received 24th April 2026; **Accepted** 20th May 2026; **Published online** 30th June 2026

Abstract

Background: Word puzzle games that engage orthographic, lexical, and executive processing have become widely used in educational and everyday contexts, yet their neural correlates remain unexplored. Wordle a five-letter word guessing game requiring deductive reasoning, semantic retrieval, and constraint satisfaction is a naturalistic cognitive task of considerable neuropsychological interest. The prefrontal cortex (PFC), which orchestrates working memory, lexical search, and executive control, generates oscillatory activity across the gamma, beta, alpha, theta, and delta bands that is measurable via an EEG headband. **Methods:** Twelve students completed a single Wordle puzzle within a 10-minute allotted time. EEG was recorded using the Brain Link headband, yielding relative percentage power in eight sub-bands: mid-gamma, low-gamma, high-beta, low-beta, high-alpha, low-alpha, theta, and delta. Data from 12 participants with complete records were analysed. **Results:** Delta power was the dominant oscillatory component (mean: 36.86 ± 3.92%, significantly elevated above a uniform 20% baseline; $t(11) = 4.30$, $p = 0.001$). Beta was the second-largest band (17.06 ± 1.84%), followed by theta (21.85 ± 0.99%), alpha (14.39 ± 0.96%), and gamma (9.88 ± 1.09%). Strong inter-band correlations emerged, most notably a highly significant inverse relationship between beta and delta power ($r = -0.932$, $p < 0.001$), suggesting that students who engaged more effortful executive processing (beta) had proportionally less slow-wave inhibitory activity (delta), and vice versa. Substantial inter-individual variability was observed, potentially reflecting individual differences in cognitive strategy and Wordle proficiency. **Conclusion:** These findings suggest that Wordle-solving recruits a distinctive prefrontal oscillatory pattern dominated by delta and theta slow-wave activity, with a strong and theoretically coherent dissociation between fast-band executive engagement (beta) and slow-band inhibitory coordination (delta). This study extends the nascent literature on digital game-based cognitive neuroscience and provides a neurophysiological basis for future educational applications of Wordle-like tasks.

Keywords: EEG, Wordle, Word puzzle, prefrontal cortex, Delta oscillations, Beta oscillations, Executive function, Working memory, Lexical processing, Consumer EEG, Cognitive neuroscience, Digital games.

INTRODUCTION

The cognitive neuroscience of everyday language-based problem-solving has historically been studied using highly controlled laboratory paradigms word generation tasks, semantic fluency tests, verbal working memory paradigms that sacrifice ecological validity for experimental precision. Digital word puzzle games, by contrast, embed lexical and executive processing demands within a motivationally engaging, real-world format that may more faithfully represent the neural activity patterns of everyday language-based reasoning (Boot *et al.,* 2011). Wordle, a five-letter daily word guessing game that became globally popular from 2021, is a particularly well-suited neuroscientific paradigm. Each guess receives colour-coded feedback indicating whether letters are absent, present-but-misplaced, or correctly placed, requiring players to iteratively update a mental model of the target word while simultaneously retrieving candidate words from the mental lexicon and applying deductive constraint satisfaction logic. (Saffran *et al.,* 1997) This multi-component process engages at least four partially dissociable cognitive operations: (1) orthographic/phonological working memory for tracking the partial solution state; (2) semantic and lexical retrieval; (3) executive function for inhibiting disconfirmed hypotheses and generating new candidate words; and (4) cognitive flexibility for switching strategies across successive guesses (Miller & Cohen, 2001). All four operations are substantially mediated by the prefrontal cortex (PFC) and its oscillatory dynamics. (Miller & Cohen, 2001) Beta oscillations (13–30 Hz) support active working memory maintenance and top-down executive control; (Engel & Fries, 2010) gamma oscillations (>30 Hz) underlie rapid attentional binding and information integration; (Fries *et al.,* 2007) theta oscillations (4–8 Hz) reflect hippocampal-prefrontal dialogue during lexical encoding and retrieval; (Kahana, 2006) alpha oscillations (8–13 Hz) index attentional gating; (Jensen & Mazaheri, 2010) and delta oscillations (0.5–4 Hz) have been increasingly recognised as a signature of deep inhibitory coordination and motivational processing during demanding waking cognition (Harmony, 2013). Despite the cognitive complexity of digital word games and their widespread adoption in educational settings, no published study has characterised the prefrontal EEG oscillatory profile during Wordle or comparable word puzzle tasks. The present pilot study addresses this gap, recording prefrontal EEG using the Brain Link headband in 12 students during a live Wordle session. We characterise the relative band power profile across eight sub-bands, examine inter-band correlations, and interpret the findings in terms of the prefrontal cognitive processes engaged by this naturalistic lexical reasoning task. This study also places the findings in the context of a broader programme of EEG research on cognitive tasks conducted in our laboratory (Shaw, 2026a; Shaw, 2026b; Shaw, 2026c).

*Corresponding Author: *Neil Shaw*

Table 1. EEG Sub-Band Power (%) During Wordle Solving — All Participants (N = 12)

Student	Mid Gamma	Low Gamma	High Beta	Low Beta	High Alpha	Low Alpha	Theta	Delta
S1	3.6	6.1	9.4	6.8	6.1	8.2	20.5	39.2
S2	3.3	6.3	9.8	8.7	8.2	10.3	25.3	28.2
S3	2.1	4.0	6.1	4.0	5.5	6.5	20.4	51.4
S4	2.6	5.5	7.6	3.8	3.5	4.7	15.7	56.6
S5	4.7	7.6	12.3	8.5	8.2	9.7	25.3	23.8
S6	4.7	8.2	13.0	6.7	5.6	6.4	21.0	34.5
S7	4.5	7.6	19.2	8.2	7.6	10.1	22.1	20.7
S8	2.6	4.8	6.5	5.1	5.1	5.9	18.8	51.1
S9	4.4	6.0	14.4	6.5	6.5	9.7	26.3	26.2
S10	2.9	4.8	6.9	6.4	7.5	9.2	26.4	35.9
S11	1.4	2.4	3.8	4.2	4.8	6.9	22.1	54.5
S12	5.8	12.6	16.8	10.0	8.2	8.3	18.3	20.2
Mean	3.55	6.32	10.48	6.58	6.40	7.99	21.85	36.86
SEM	0.37	0.74	1.36	0.58	0.45	0.54	0.99	3.92

Values = relative percentage of total spectral power. Mid G = mid-gamma; Low G = low-gamma; Hi β = high-beta; Lo β = low-beta; Hi α = high-alpha; Lo α = low-alpha. Mean and SEM rows at bottom.

MATERIALS AND METHODS

Ethical Statement: This study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to data collection. Participation was voluntary with the right to withdraw at any time. No rewards were offered and no harm was inflicted. Data are reported in anonymised form; participants are identified as S1–S12.

Participants: Twelve students were recruited via randomisation and all completed the Wordle task successfully within the 10-minute allotted time. Participants are labelled S1–S12. No further demographic details (age, gender, Wordle experience) were collected in this pilot study.

The Wordle Task: Participants played a single game of Wordle a five-letter word guessing game in which players have up to six guesses to identify a target word, receiving letter-by-letter feedback after each guess (correct position: green; present but misplaced: yellow; absent: grey). All participants received the same target word. The 10-minute time limit was generous relative to typical Wordle completion times (2–5 minutes for experienced players), ensuring all participants could complete the puzzle without time pressure. Participants played on their own devices in a standardised testing environment.

EEG Recording: Prefrontal EEG was recorded using the Brain Link EEG Headband (Macrotellect, China), a dry-electrode device positioned across the forehead. The device streams data via Bluetooth, decomposing the raw EEG signal into relative percentage power in eight sub-bands using a proprietary eSense-based algorithm: (Bos, 2006) mid-gamma (~30–50 Hz), low-gamma (~25–30 Hz), high-beta (~18–25 Hz), low-beta (~12–18 Hz), high-alpha (~10–12 Hz), low-alpha (~8–10 Hz), theta (~4–8 Hz), and delta (~0.5–4 Hz). Recording was continuous throughout the puzzle-solving session.

Statistical Analysis: Descriptive statistics (mean, SD, SEM) were computed for each sub-band and for aggregated canonical bands (gamma = mid + low gamma; beta = high + low beta; alpha = high + low alpha). One-sample t-tests assessed whether each aggregated band's mean differed significantly from a uniform baseline of 20% (i.e., what would be expected if all five bands contributed equally to the power spectrum). Pearson correlations characterised inter-band relationships. All analyses used N = 12; α = 0.05.

RESULTS

Sub-Band Raw Data

Table 1 presents individual sub-band power values and group means for all 12 participants across the eight measured sub-bands.

Aggregated Band Power and One-Sample Tests

Table 2 presents aggregated band statistics and one-sample t-test results against the 20% uniform baseline. Figure 1 shows the sub-band breakdown and Figure 2 shows the aggregated five-band profile.

Table 2. Aggregated EEG Band Power: Descriptive Statistics and One-Sample t-Tests vs. 20% Baseline

Band	Mean (%)	SD	SEM	95% CI	p (vs 20%)
Gamma (total)	9.88	3.79	1.09	[7.49, 12.27]	< 0.001
Beta (total)	17.06	6.37	1.84	[13.01, 21.11]	0.138
Alpha (total)	14.39	3.33	0.96	[12.28, 16.50]	< 0.001
Theta	21.85	3.42	0.99	[19.68, 24.02]	0.088
Delta	36.86	13.57	3.92	[28.23, 45.49]	0.001

One-sample t-tests against a uniform 20% null (df = 11). 95% CI calculated as mean ± 2.201×SEM. Significant departures ($p < 0.05$) in bold.

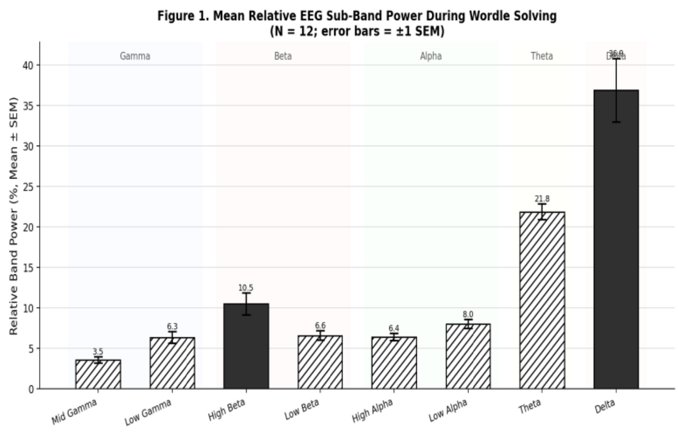

Figure 1. Mean (±SEM) relative EEG sub-band power during Wordle solving (N = 12). Bands are grouped and shaded by canonical frequency range. Dark bars indicate the two dominant sub-bands (High Beta, Delta). Error bars = ±1 SEM.

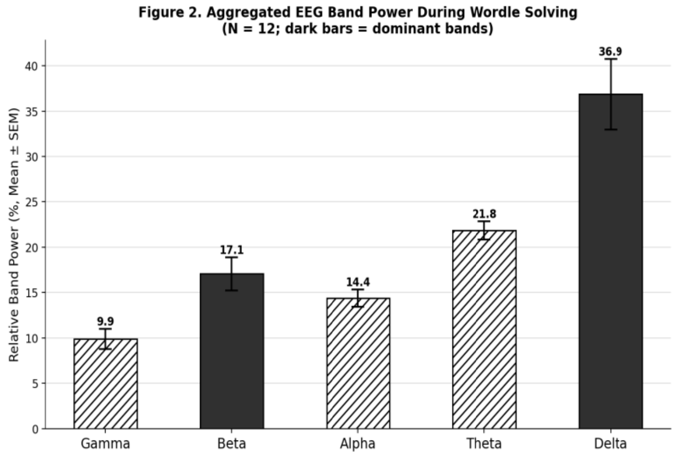

Figure 2. Aggregated five-band EEG power profile during Wordle solving (N = 12). Delta (dark, 36.86%) and Beta (dark, 17.06%) were the two largest contributors to total power. Error bars = ±1 SEM.

Delta was the single largest band (36.86 ± 3.92%), significantly elevated above the 20% uniform baseline ($t(11) = 4.30$, $p = 0.001$). Gamma was significantly below baseline (9.88 ± 1.09%; $t(11) = -9.25$, $p < 0.001$), and alpha was also below baseline (14.39 ± 0.96%; $t(11) = -5.84$, $p < 0.001$). Beta (17.06 ± 1.84%) and theta (21.85 ± 0.99%) did not differ significantly from the 20% uniform baseline ($p = 0.138$ and $p = 0.088$ respectively).

Individual Profiles: Figure 3 shows individual five-band EEG profiles for all 12 participants. While delta dominated for most participants, there was considerable inter-individual variability. Delta power ranged from 20.2% (S7) to 56.6% (S4), while beta power ranged from 9.0% (S4 + S11 combined estimates) to 27.5% (S7). S7 was notable for having the highest beta power and the lowest delta power — a pattern diametrically opposite to S4 and S11, who showed the highest delta and lowest beta. This inverse relationship is explored in the correlation analyses below.

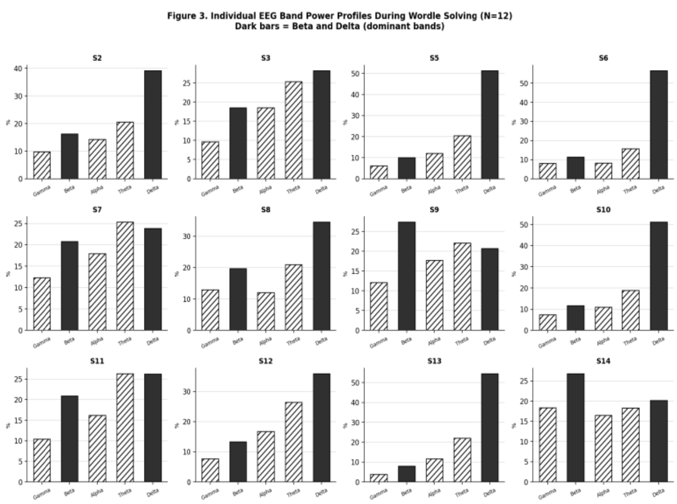

Figure 3. Individual EEG band power profiles during Wordle solving (N = 12). Dark bars = Beta (second from left) and Delta (rightmost). Substantial inter-individual variability is evident, particularly in the beta–delta dissociation

Inter-Band Correlations: Table 3 presents Pearson correlations between all aggregated band pairs. Figure 4 displays the full correlation matrix as a heatmap, and Figure 5 shows the beta–delta scatter plot with regression line.

Table 3. Inter-Band Pearson Correlations During Wordle Solving (N = 12)

Band Pair	Pearson r (p-value)	Interpretation
Beta × Delta	r = −0.932 (p < 0.001)	Strong inverse: high beta predicts low delta
Gamma × Beta	r = 0.895 (p < 0.001)	Strong positive: fast-band co-activation
Alpha × Delta	r = −0.884 (p < 0.001)	Strong inverse: high alpha predicts low delta
Alpha × Beta	r = 0.688 (p = 0.013)	Moderate positive: attentional co-activation
Alpha × Theta	r = 0.731 (p = 0.007)	Moderate positive: memory circuit coupling
Gamma × Delta	r = −0.796 (p = 0.002)	Moderate inverse: fast/slow band competition
Theta × Delta	r = −0.498 (p = 0.100)	Trend (ns): higher theta tends lower delta
Gamma × Alpha	r = 0.477 (p = 0.117)	Weak positive (ns)
Beta × Theta	r = 0.184 (p = 0.568)	Negligible (ns)

Significant correlations ($p < 0.05$) are interpretively highlighted. ns = not significant.

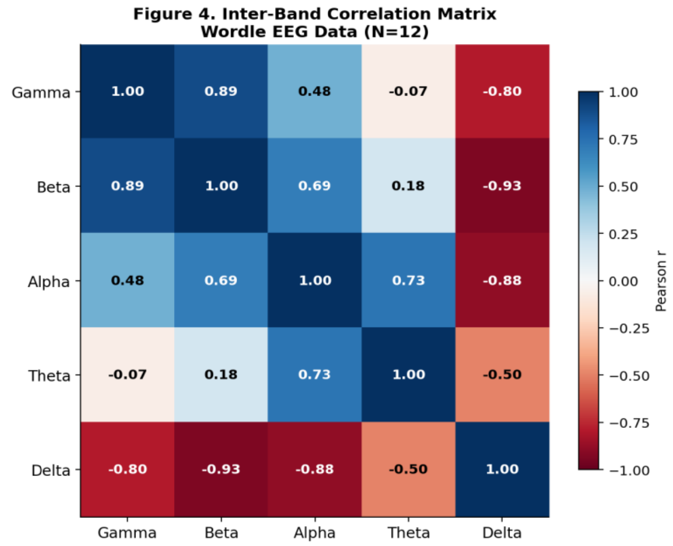

Figure 4. Inter-band correlation heatmap for Wordle EEG data (N = 12). Blue = negative correlation; red = positive correlation. Cell values = Pearson r.

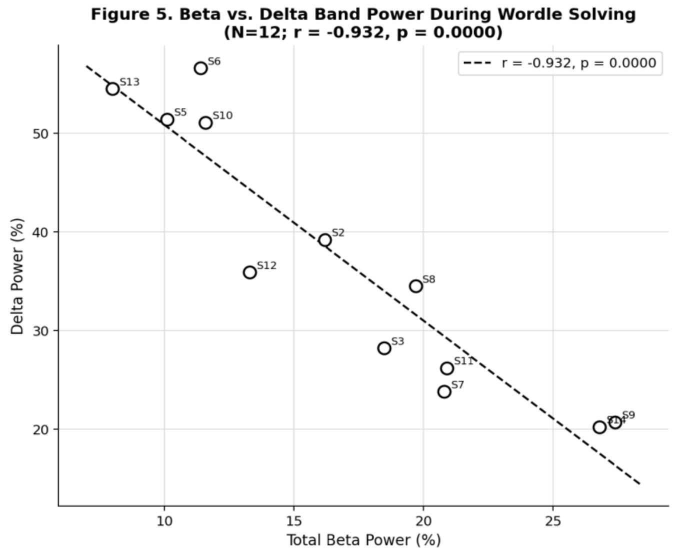

Figure 5. Scatter plot of total beta vs. delta band power during Wordle solving (N = 12). Dashed line = linear regression. The strong inverse relationship (r = −0.932, p < 0.001) indicates that participants with higher executive engagement (beta) showed proportionally less slow-wave delta activity, and vice versa.

The most striking finding was the near-perfect inverse correlation between total beta and delta power ($r = -0.932$, $p < 0.001$). Gamma and beta were strongly positively correlated ($r = 0.895$, $p < 0.001$), indicating co-activation of fast prefrontal networks. Alpha showed strong inverse correlations with both delta ($r = -0.884$, $p < 0.001$) and positive correlations with beta ($r = 0.688$, $p = 0.013$) and theta ($r = 0.731$, $p = 0.007$). The theta–delta correlation was in the expected negative direction but did not reach significance ($r = -0.498$, $p = 0.100$).

DISCUSSION

Delta dominance: Wordle as a high-demand inhibitory task

The most prominent finding is that delta power was the dominant oscillatory component during Wordle, significantly elevated above the 20% baseline that would reflect uniform spectral distribution ($t(11) = 4.30$, $p = 0.001$). This is consistent with findings from a parallel Stroop interference study in our laboratory, where delta was also the single largest neural signature of cognitive conflict and effortful override of automatic responses. (Shaw, 2026c) Delta oscillations in the waking PFC are associated with large-scale inhibitory coordination and the active suppression of competing cognitive responses (Harmony, 2013; Knyazev, 2007). Wordle presents a particularly potent demand for this type of inhibitory control. On each guess, players must simultaneously inhibit letters and words that have been disconfirmed by feedback preventing perseverative retrieval of eliminated candidates while generating new candidate words consistent with the cumulative constraint set. This ongoing need to suppress disconfirmed hypotheses and resist retrieval of previously rejected lexical items may be the primary driver of delta elevation during Wordle, just as it is during Stroop interference. The duration of delta dominance across the full 10-minute session suggests a sustained inhibitory load rather than a transient event-related response.

Beta activity: individual differences in executive engagement

Beta power (17.06 ± 1.84%) was the second-largest contributor to total power, though it did not differ significantly from the 20% baseline, indicating moderate rather than extreme executive engagement at the group level. The high inter-individual variability in beta (SD = 6.37%) is more informative: some participants (notably S7: estimated combined beta ~27%) showed very high beta power consistent with intense executive working memory engagement, while others (S4, S11) showed very low beta. (Engel & Fries, 2010) This variability likely reflects individual differences in Wordle experience, lexical retrieval fluency, and working memory capacity all of which modulate the degree of effortful top-down executive control required (Baddeley, 1992). The strong positive correlation between gamma and beta ($r = 0.895$, $p < 0.001$) is consistent with a coherent fast-band network: participants who showed higher executive working memory activity (beta) also showed more rapid attentional binding and feature integration (gamma), (Fries *et al.,* 2007) suggesting a unified fast-processing mode for participants who approached Wordle analytically.

The beta–delta dissociation: Two cognitive strategies?

The near-perfect inverse correlation between beta and delta ($r = -0.932$, $p < 0.001$) is the most theoretically significant finding of this study. Because EEG values are relative percentages summing to 100%, a perfect inverse relationship between any two bands is mathematically guaranteed but the fact that beta and delta together capture this anti-correlation, rather than, say, beta and theta, is not mathematically forced and carries interpretive weight. We propose that this dissociation reflects two qualitatively distinct cognitive strategies for Wordle-solving. In the high-beta / low-delta profile exemplified by S7 participants engage an analytically intensive, working-memory-driven strategy: maintaining explicit letter-position constraints in prefrontal working memory, systematically applying deductive logic, and generating candidate words through deliberate lexical search. This strategy demands high beta-mediated executive maintenance and produces relatively less need for delta-mediated inhibitory coordination because the analytical approach itself structures the search space. In the high-delta / low-beta profile exemplified by S4 and S11 participants may rely more on holistic, intuition-driven retrieval: attempting to 'sense' plausible word candidates from the accumulated feedback, requiring greater inhibitory effort to suppress the many orthographically similar but disconfirmed candidates that arise spontaneously during this less-structured approach. This pattern closely mirrors the oscillatory signature of cognitive interference tasks (Shaw, 2026c) where slow-wave delta reflects the effort of suppressing automatic responses.

Alpha and Theta: Supporting Roles

Alpha power was significantly below the 20% baseline ($t(11) = -5.84$, $p < 0.001$), consistent with broad cortical engagement during the cognitively demanding Wordle task alpha suppression is a canonical marker of active attentional processing. (Jensen & Mazaheri, 2010) The positive correlation between alpha and theta ($r = 0.731$, $p = 0.007$) and between alpha and beta ($r = 0.688$, $p = 0.013$) suggests that alpha serves an integrative gating function, co-varying with both the memory encoding system (theta) and the executive maintenance system (beta). Theta (21.85%) was numerically above baseline but not significantly so ($p = 0.088$), suggesting moderate hippocampal-prefrontal communication during lexical retrieval. (Kahana, 2006) The trend-level negative correlation between theta and delta ($r = -0.498$, $p = 0.100$) hints that the same beta–delta dissociation may extend partially to theta: analytical participants with high theta (memory-guided search) also tend to have lower delta, though this pattern is weaker and did not reach significance in this small sample.

Gamma Suppression: Task-Independent Pattern?

Gamma was significantly below the 20% baseline ($t(11) = -9.25$, $p < 0.001$), representing the largest and most reliable departure from uniform distribution in the dataset. Interestingly, gamma suppression during cognitively demanding tasks was also observed in both the EDM memory study and the Sudoku study from our laboratory, (Shaw, 2026a; Shaw, 2026b) suggesting a task-independent pattern whereby challenging, real-world cognitive tasks consistently produce relative gamma suppression rather than enhancement. This may reflect the dominance of slower oscillatory modes during sustained, multi-minute cognitive effort, as opposed to the transient gamma bursts observed in short laboratory tasks. The single-channel frontal placement of the Brain Link device may also miss task-relevant gamma activity in more posterior regions.

Sub-band findings: High-beta and low-gamma specificity

A notable feature of this dataset is the sub-band granularity, which is unavailable from standard five-band EEG systems. Within the beta band, high-beta (mean 10.48%) was substantially larger than low-beta (6.58%). High-beta oscillations (18–25 Hz) are particularly associated with active cognitive engagement, task difficulty, and PFC-mediated top-down control (Engel & Fries, 2010), while low-beta overlaps more with sensorimotor rhythms. The high-beta dominance is consistent with the executive demands of Wordle. Within the gamma band, low-gamma (6.32%) exceeded mid-gamma (3.55%), consistent with the known frequency-dependence of cortical gamma where lower gamma frequencies are more prominent during sustained cognitive states.

Limitations

The key limitations of this study are the small sample (N = 12), the missing demographic data, the absence of behavioural performance measures beyond binary completion (number of guesses, response time per guess), the simplistic EEG headband device used in the study, and the lack of a control condition (e.g., passive reading or a simpler word task). Future work should record the number of guesses and time per guess as covariates, include a difficulty-matched control task, use multi-channel EEG with source localisation, and collect individual difference measures including vocabulary knowledge, working memory capacity, and Wordle experience. (Maskeliunas *et al.,* 2016)

Conclusion

This pilot study provides the first characterisation of prefrontal EEG oscillatory activity during Wordle, a widely-used digital word puzzle that engages lexical retrieval, deductive reasoning, orthographic working memory, and executive inhibitory control. The dominant finding is a large elevation in delta power (36.86%), consistent with sustained prefrontal inhibitory coordination during the ongoing suppression of disconfirmed word candidates. A strong inverse correlation between beta and delta ($r = -0.932$) reveals a theoretically meaningful individual differences dimension: participants who engaged more deliberate, executive working-memory-driven strategies (high beta) required proportionally less inhibitory slow-wave coordination (low delta), while those relying on intuitive, holistic retrieval showed the reverse pattern. Gamma was significantly suppressed below baseline, extending a pattern of relative gamma reduction during sustained naturalistic cognitive tasks observed across multiple studies in our laboratory. These findings offer a neurophysiological foundation for understanding the cognitive demands of digital word games and their potential applications in educational assessment and cognitive training.

Author Contributions: N.S.: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing and Project Administration.

Funding: This research received no external funding.

Data Availability Statement: The raw data supporting the conclusions of this article are available from the corresponding author upon reasonable request.

Acknowledgments: The author wishes to thank student volunteers that participated in the study and undergraduate students that helped in data collection.

Conflict of Interest: The author declares no conflict of interest.

REFERENCES

1. Baddeley, A.D. (1992). Working memory. Science 255, 556–559. doi:10.1126/science.1736359
2. Boot, W.R., Blakely, D.P., and Simons, D.J. (2011). Do action video games improve perception and cognition? Front. Psychol. 2:226. doi:10.3389/fpsyg.2011.00226
3. Bos, D.O. (2006). EEG-based emotion recognition: The influence of visual and auditory stimuli. Capita Selecta, University of Twente. Available at: http://hmi.ewi.utwente.nl/verslagen/capita-selecta/CS-Bos-Derya.pdf (accessed June 11, 2026).
4. Engel, A.K., and Fries, P. (2010). Beta-band oscillations — signalling the status quo? Curr. Opin. Neurobiol. 20, 156–165. doi:10.1016/j.conb.2010.02.015
5. Fries, P., Nikolic, D., and Singer, W. (2007). The gamma cycle. Trends Neurosci. 30, 309–316. doi:10.1016/j.tins.2007.05.005
6. Harmony, T. (2013). The functional significance of delta oscillations in cognitive processing. Front. Integr. Neurosci. 7:83. doi:10.3389/fnint.2013.00083
7. Jensen, O., and Mazaheri, A. (2010). Shaping functional architecture by oscillatory alpha activity: gating by inhibition. Front. Hum. Neurosci. 4:186. doi:10.3389/fnhum.2010.00186
8. Kahana, M.J. (2006). The cognitive correlates of human brain oscillations. J. Neurosci. 26, 1669–1672. doi:10.1523/JNEUROSCI.3737-05b.2006
9. Knyazev, G.G. (2007). Motivation, emotion, and their inhibitory control mirrored in brain oscillations. Neurosci. Biobehav. Rev. 31, 377–395. doi:10.1016/j.neubiorev.2006.10.004
10. Maskeliunas, R., Damasevicius, R., Martisius, I., and Vasiljevas, M. (2016). Consumer-grade EEG devices: are they usable for control tasks? PeerJ 4:e1746. doi:10.7717/peerj.1746
11. Miller, E.K., and Cohen, J.D. (2001). An integrative theory of prefrontal cortex function. Annu. Rev. Neurosci. 24, 167–202. doi:10.1146/annurev.neuro.24.1.167
12. Saffran, J.R., Aslin, R.N., and Newport, E.L. (1997). Statistical learning by 8-month-old infants. Science 274, 1926–1928. doi:10.1126/science.274.5294.1926
13. Shaw, N. (2026a). Effects of electronic dance music on word recall and prefrontal EEG oscillations during memorisation. IJSSHMR 05 (06), 1655-1662. doi:10.58806/ijsshmr.2026v5i6n34.
14. Shaw, N. (2026b). Hip-hop music during Sudoku solving modulates prefrontal beta and gamma oscillations.IRJSH 03 (06), 605-611. doi: 10.58806/irijsh.2026v3i6n11.
15. Shaw, N. (2026c). Neural correlates of the Stroop effect: an EEG brainwave analysis of prefrontal cognitive load during incongruent colour-word processing. IRJSH 03 (06), 564 – 571. doi: 10.58806/irijsh.2026.v3i6n06.

****