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# Analysis of Impact of Task Difficulty on Sensory Motor Rhythm (SMR) in Talent Identification

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**Abstract:** ***The objective of this research was to Analyze whether task difficulty influences sensory motor rhythm (SMR) readings, a brain activity pattern observed in the motor cortex. The study aimed to explore the potential of using SMR as a psychological capacity for talent identification. We hypothesized that SMR readings would vary with task difficulty, reflecting different levels of motor cortex activity. SMR was assessed using an EEG Biofeedback machine while participants engaged with tasks of varying difficulty on the Neuro - Tracker Device. Although there was no significant difference in Alpha, Beta, Delta, and Theta waves across difficulty levels, individual variations in brain wave patterns were observed, suggesting a scope for future research.***

**Keywords:** SMR, Brain Activity, Biofeedback, Neuro - Tracker, task difficulty

## 1. Introduction

In the quest for better talent identification methods, understanding the brain's response to varying task difficulties can provide valuable insights. The sensory motor rhythm (SMR) is an idle rhythm of the brain linked to the motor cortex, with higher SMR power associated with superior performance. This study investigates whether task difficulty settings on the Neuro - Tracker Device affect SMR readings, potentially contributing to more effective talent identification techniques.

## 2. Methodology

- **Participants:** 15 male students of physical education from LNCPE of 18 - 21 years.
- **Equipment:** EEG Biofeedback machine, Neuro - Tracker Device
- **Procedure:** Participants performed tasks at four difficulty settings: core, dynamic, selective, and distribute. SMR was recorded during each task with proper intervals between them.
- **Data Analysis:** Comparison of SMR, Alpha, Beta, Delta, and Theta waves across different difficulty levels.

## 3. Results

The analysis revealed no significant difference in Alpha, Beta, Delta, and Theta brain waves across the varying task difficulty levels. However, individual participants exhibited unique patterns of brain wave activity at each difficulty setting, indicating that personal physiological responses may influence performance.

## 4. Discussion

The lack of significant differences in brain wave activity across task difficulties suggests that SMR readings may not directly correlate with task complexity in a uniform manner. However, the observed individual variations highlight the potential of using brain wave patterns to assess personal capabilities and tailor talent identification processes.

## 5. Conclusion

While the study did not find significant differences in overall brain wave patterns across task difficulties, the individual variations suggest a promising avenue for future research. Identifying specific brain wave wavelengths associated with performance on particular tasks could enhance talent identification methods, making them more personalized and effective.

## 6. Future Directions

Further research should focus on larger sample sizes and diverse populations to validate these findings. Additionally, exploring other brain wave frequencies and incorporating advanced neuroimaging techniques could provide deeper insights into the relationship between task difficulty and brain activity.

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