DREAM AND IMAGE IN BLIND SUBJECTS

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Problem:
- *Do Blind subjects have visual content, either complex or simple, in their dreams?*
- *Is the Visual Content correlated with the EEG's spectral components?*

Abstract

Four born-blind and four later-blind subjects, with ages ranging from 21 to 43 years old, both male and female, were analysed during two consecutive nights of polysomnography at the subjects' home. The subjects were awaken every 90 minutes and recorded their dreams. A content analysis on the dream recordings based on the Hall & Van de Castle criteria and a spectral analysis of the sleep EEG were performed. Consistent correlation between the dream recording variables and the spectral parameters of the sleep EEG were found through the Perason´s Correlation Coefficient (r) showing a significant negative correlation between the Visual Activation Index (VAI) and the alpha rhythm (8-12 Hz) and a positive correlation between the VAI and the higher frequencies (>25 Hz).

Conclusions

The alpha power attenuation with visual content was also verified, in sighted subjects, during visual exploration in several studies. It seems possible that blind subjects could produce virtual images, that is, that they might be activating the visual cortex when visual content

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appears in their speech. This idea is reenforced by the higher frequencies increase during visual exploration also observed in previous studies. These visual-related-fast-rhythms were also observed in the dog's occipital cortex when intense attention was paid to a visual stimulus and during behavioural immobility associated with an enhanced level of vigilance while the cat was watching a visible but unseizable mouse.

The first striking fact appeared when we listen to the recordings for the first time since they were much more similar to sighted subjects reports than we would expect, against some authors.

After the recordings' classification and before their rejection for statistical purposes, 75% of the volunteers presented reports with visual components. Blind subjects present visual contents in their dreams with differences between the REM and the NREM stages. Moreover the greater incidence of visual activity during REM seems to confirm the paradoxical sleep imagery component.

Correlations between the dream recording variables and the sleep EEG parameters were found in a robust and consistent pattern. Regarding the visual content, a positive relation with the nouns and the higher frequencies and a negative correlation with the alpha band were observed. This could mean that a report with visual content could reflect not only previous learned concepts but also a visual cortex activation.

Discussion and Perspectives

These results are in line with data obtained both in humans and animals concerning alpha attenuation during different modalities visualisation and therefore it is likely that blind subjects might have an occipital activation during visual imagery, actually present in their dreams.