

摘要

研究目的：睡眠遲惰 (sleep inertia) 指的是剛由睡眠中醒來的一種現象，在這段轉換期間內，個體的警覺力較低、心智較為遲緩，認知和行為表現都較差。過去針對睡眠遲惰的研究顯示，睡眠遲惰是從一個較低生理激發的狀態到較高生理激發的漸進式轉換過渡階段。若睡眠遲惰是與較低的生理激發狀態有關，則若能提高個體的激發狀態，應能減少睡眠遲惰的負面影響。從過去的文獻中可發現，快節奏的音樂可以提高個體的生理激發。因此，本研究針對音樂的節奏快慢做操弄，探討生理激發狀態在睡眠遲惰所扮演的角色，比較不同快慢節奏的音樂刺激對於睡眠遲惰效果的影响。

方法：12 名年齡介於 18 到 31 歲之間的受試者參與此研究。受試者在 20 分鐘小睡被喚醒後，分次接受快節奏音樂、慢節奏音樂、以及無音樂控制情境等三種情境安排。睡醒後的實驗期間為 1 小時，受試者每 10 分鐘被要求進行加法作業及填寫卡羅連斯加睡意量表 (Karolinska Sleepiness Scale)、視覺類比量表 (visual analog scales)、以及情緒評估等主觀量表，總計六次。同時，他們的腦電波 (electroencephalogram)、心率變異率 (heart rate variability)、膚電反應 (skin conductance responses)、指溫等生理反應亦被記錄。

結果：受試者在認知表現或主觀評量上的確顯現出睡眠遲惰的效果，其加法作業的完成題數隨著時間增加，而主觀睡意則隨著時間減少。快節奏音樂情境比慢節奏音樂情境有顯著較高的主觀激發程度，並有較清醒的評量。在生理測量部分，受試者在快節奏音樂情境中有顯著較高的非特定刺激引起之膚電反應 (Non-specific skin conductance responses) 和腦電波較多 beta 波的趨勢。然而，儘管受試者的主觀評量會受到音樂刺激的影响而有不同，其認知表現並沒

有出現類似的效果。

結論：本研究發現藉由音樂提高激發狀態，可使主觀睡意評量降低，但認知表現並不受到影響。此分離的現象顯示睡眠遲惰的消散不能以單一的生理激發狀態來解釋，而必須考慮多種歷程機制同時運作的可能性。

關鍵詞：睡眠遲惰、主觀評量、認知行為表現、音樂、生理激發

Abstract

Objective : Sleep inertia (SI) is a transitional state occurring immediately after awakening from sleep that are associated with sleepiness, decreased alertness and decrement in cognitive performance. It has been suggested that SI may be due to a decline in arousal level. Therefore, it was hypothesized that factors likely increasing arousal would reduce the effects of SI. Previous studies showed that fast-tempo music may enhance the level of arousal. The present study was conducted to clarify the role of arousal in SI by exposure to music with different tempos.

Methods : Twelve healthy young adults, aged 18 to 31 years, participated in the study. All subjects went through three conditions: a fast-tempo music, a slow-tempo music, and a control (no music) conditions. Music stimuli were applied to subjects awaked from a 20-mins nap, and the subjects were given an addition task and asked to rate their level of subjective sleepiness and arousal on the Karolinska Sleepiness Scale (KSS), visual analog scales (VAS) and emotional rating scales 6 times over an hour. During the test period, their physiological arousal state was recorded, including electroencephalogram (EEG), heart rate variability (HRV), skin conductance responses (SCR), finger temperature.

Results : The effects of SI on cognitive throughput and subjective ratings were evident. Their performance on the addition task increased and sleepiness decreased over time. Subjective sleepiness was significantly reduced and physiological arousal level measured by non-specific skin conductance responses (NS-SCRs) and EEG beta power were elevated when the participants were exposed to fast-tempo music.

However, cognitive performance was not influenced by music exposure.

Conclusion : The present findings suggest that increased arousal level during SI by manipulating music stimuli may decrease subjective sleepiness but have no impact on cognitive performance. This dissociative effect suggests that the dissipation of sleep inertia may not be a function of a general arousal level. Rather, there may be multiple processes that are responsible for different aspects of SI.

Key words : Sleep inertia, subjective sleepiness, performance, music, arousal