

## Mind-wandering plus mindfulness: say ‘no’ to negative mood or depression

Mind wandering and its equivalent concepts such as self-generated thought, stimulus independent thought, task-unrelated thought, and spontaneous thought refer to a mental phenomenon that occupies considerable time in everyday life. The high frequency of the occurrence of mind wandering has made researchers interested in studying its different aspects, such as its underlying brain activity and its functions and consequences.

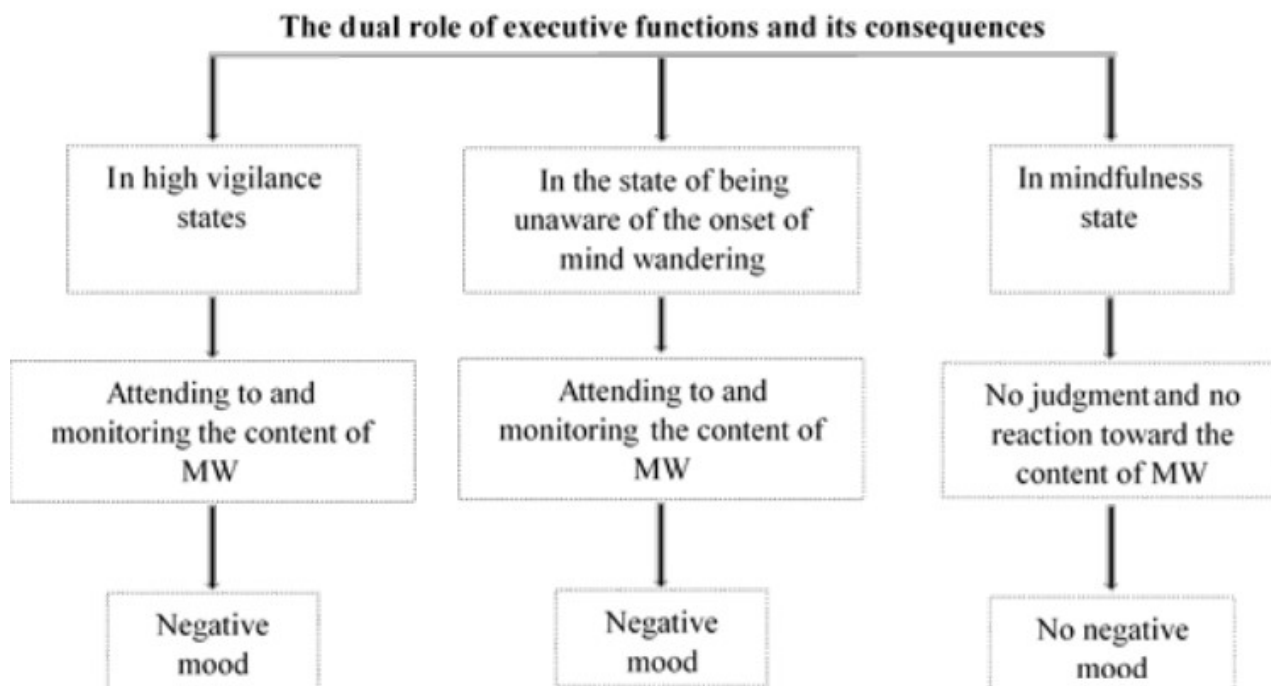


Fig. 1. Executive functions, such as attending to and monitoring the content of mind wandering, can play as mediators between mind wandering and negative mood. The occurrence of mind wandering during high vigilance states and the lack of awareness of the onset of mind wandering are two examples of conditions in which executive functions lead to negative mood. However, during mindfulness meditation, the lack of judgment and reaction toward mind wandering, which is another aspect of executive functioning, can prevent the emergence of negative mood.

In terms of brain activity, several brain imaging studies show that the default network (DN) and frontoparietal control network (FPCN) are two prominent brain networks that are active during mind wandering. The DN is the collection of certain brain regions that exhibit more activity during rest compared to when we are engaged in a task. The FPCN is the neural substrate of executive functions. Executive functions are a set of mental skills such as planning, memory, monitoring and

controlling behavior and mental activity.

Many studies have focused on the functions and consequences of mind wandering. According to these studies mind wandering may contribute to positive functions such as creativity, planning, learning, and problem solving. Despite such positive functions, mind wandering also can contribute to negative mood and even depression. The increased activity in the DN is a hallmark of depression.

Previous studies have demonstrated that the content of mind wandering, as a key factor, determines whether it leads to negative mood or not. The present study introduces new factors that can affect the relationship between mind wandering and negative mood. We argue that attending to and monitoring the content of mind wandering can play a role in generating negative mood. Attending to mental contents and monitoring them are subsets of executive functions. There are more such executive functions (therefore more activity in the FPCN) involved when mind wandering occurs while individuals are in high vigilance states (compared to low vigilance states). In this case, individuals report more negative mood. Similar results are observed when mind wandering occurs while individuals are unaware of the moment of its onset (compared to when individuals are aware of the moment of its onset). "Vigilance" refers to the states of alertness that descend to sleep onset and is measured by recording the electrical activity of the brain.

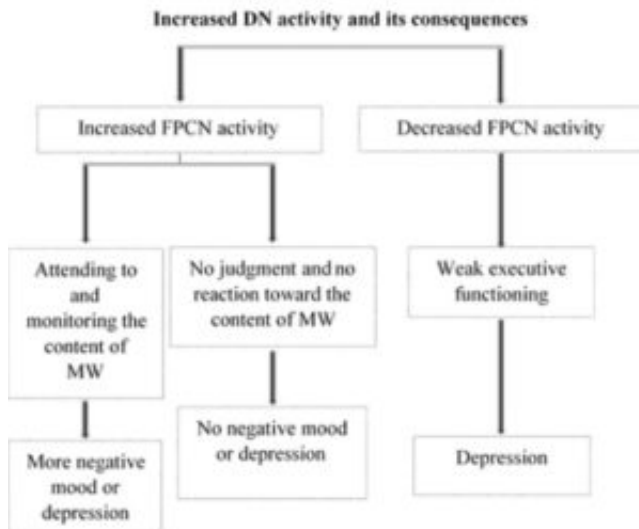


Fig. 2. The dual role of FPCN activity during increased activity of the DN. Depending on the functions performed by the FPCN during such increased activity, negative mood may arise or not. Also, during increased DN activity, decreased activity in the FPCN, as the indicative of weak executive functioning, can lead to negative mood and depression.

The above observations show that negative mood, as a consequence of mind wandering, depends

on the FPCN activity. Therefore, the FPCN plays a role in generating negative mood whereas in depression the FPCN activity is weak.

But how does all this relate to mindfulness? Evidence from studies of meditation practices, including mindfulness meditation, helps to provide an answer. In mindfulness meditation the focus is on the present moment. In this state, there are no reaction and no judgment (i.e. detachment) toward what arises in the body and mind as well as in the external world. When mind wandering occurs during mindfulness, the activity of both the DN and FPCN increases but no negative mood is observed. The lack of negative mood results from the function of the FPCN which becomes engaged during mindfulness. This results in not reacting to or thinking upon the content of mind wandering.

To sum up, the FPCN, as the neural correlate of executive functions, can play a dual role. It can generate or prevent negative mood. Despite the similarity between depression and mindfulness in terms of the increase in DN activity, the weakness of executive functions in depression cannot prevent negative mood. This suggests that the therapeutic interventions for depression should focus on ways other than usual ways such as suppressing DN activity.

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## **Publication**

[A closer look at the relationship between the default network, mind wandering, negative mood, and depression.](#)

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