



Mind-wandering and negative mood: Does one thing really lead to another?



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ABSTRACT

Mind-wandering is closely connected with negative mood. Whether negative mood is a cause or consequence of mind-wandering remains an important, unresolved, issue. We sought to clarify the direction of this relationship by measuring mood *before* and *after* mind-wandering. We also measured the affective content, time-orientation and relevance of mind-wandering to current concerns to explore whether the link between mind-wandering and negative mood might be explained by these characteristics. A novel experience-sampling technique with smartphone application prompted participants to answer questions about mind-wandering and mood across 7 days. While sadness tended to precede mind-wandering, mind-wandering *itself* was not associated with later mood and only predicted feeling worse if its content was negative. We also found prior sadness predicted retrospective mind-wandering, and prior negative mood predicted mind-wandering to current concerns. Our findings provide new insight into how mood and mind-wandering relate but suggest mind-wandering is not inherently detrimental to well-being.

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1. Introduction

Imagine a day during which your mind does not wander; you remain intently focused on your present-moment activities. Not only would this be a remarkable feat given that mind-wandering constitutes between a third and half of waking life (Killingsworth & Gilbert, 2010; Klinger & Cox, 1987), but were it to occur, then there is reason to think you might be happier. Mind-wandering – defined as mental content that is task-unrelated and stimulus-independent (Stawarczyk, Majerus, Maj, Van der Linden, & D'Argembeau, 2011) – appears to be closely connected with negative mood. However, the precise nature of this relationship is unclear, with evidence suggesting that a negative mood might be an antecedent (Smallwood, Fitzgerald, Miles, & Phillips, 2009) or a consequence (Killingsworth & Gilbert, 2010) of a wandering mind. A question that naturally follows from this is whether or not mind-wandering is something that should be discouraged. If mind-wandering does lower mood, then this implies that reducing mind-wandering would be emotionally beneficial. But, if mind-wandering is only preceded by a negative mood, then there would be no (affective) reason to prevent the mind from wandering. Indeed, the contention that mind-wandering has a negative impact on our emotional lives has been recognised an important, yet unresolved, issue (Mason, Brown, Mar, & Smallwood, 2013). In this study, we sought to provide more conclusive causal evidence to clarify whether negative mood can be considered a precursor or consequence of mind-wandering by measuring mood *before* and *after* mind-wandering in daily life. In addition, we explored whether the link between mind-wandering

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and negative mood might be more fully explained by considering three characteristics of mind-wandering: its affective content, time-orientation, and relevance to current life concerns.

1.1. *The relationship between mind-wandering and negative mood*

The association between mind-wandering and negative mood has been well-documented. Research consistently indicates that individuals with depressive symptomology have elevated levels of mind-wandering. This association has been demonstrated amongst clinically depressed (Watts, MacLeod, & Morris, 1988) and dysphoric samples (Carriere, Cheyne, & Smilek, 2008) from measures of mind-wandering tendency and mind-wandering during experimental tasks (Smallwood, O'Connor, & Heim, 2005; Smallwood, O'Connor, Sudbery, & Obonsawin, 2007; Smallwood, Davies, Heim, Finnigan, Sudbery, O'Connor & et al., 2004a, Smallwood, O'Connor, Sudbery, Haskell, & Ballantyne, 2004b, Experiment 1). Although sadness is a hallmark of depression, it would be premature to conclude that the above findings are due to *sadness* rather than other features of depression or dysphoria. Even if sadness is responsible for these associations, then both the direction of this relationship (does sadness exacerbate mind-wandering or does mind-wandering contribute to aversive feelings?) and the presence of this link in non-depressed/dysphoric individuals remains in question.

Research capable of making stronger causal claims in this regard is conflicting. Induction of a negative, compared to positive, mood has been shown to increase both subjective reports and behavioural measures of mind-wandering, suggesting that negative mood might lead to, or exacerbate, mind-wandering (Smallwood et al., 2009). Another investigation found that both happy and sad (compared to neutral) mood inductions were associated with more task-irrelevant thought (Seibert & Ellis, 1991). In contrast, Killingsworth and Gilbert (2010), who collected real-time reports of mind-wandering and happiness from 2250 participants, concluded that unhappiness was a *consequence* (but not a cause) of mind-wandering. This was based on time-lag analyses in which mood was lower after, than before, mind-wandering. However, it is worth noting that there was often a large time lag between reports of mind-wandering and mood because participants only provided between 1 and 3 daily reports that were hours (sometimes even days) apart. Given this large time lag it is both difficult to imagine that single instances of mind-wandering would have such an enduring mood-dampening effect and likely that other intervening events might account for this result (Klinger, 2011; Klinger, 2013; Mason et al., 2013). A more direct method to establish whether mind-wandering exerts an impact on later mood would be to measure mood more closely following mind-wandering.

The conclusions from experimental and experience sampling methods diverge: the former suggests that a negative mood may be a precursor of mind-wandering whilst the latter suggest that a lower mood is a consequence of mind-wandering. These possibilities are not mutually exclusive; negative mood might be both preceded and followed by mind-wandering and of course neither could be the case, or there may be third variable explanations (Mason et al., 2013). Given this apparent disparity, we designed a study to determine whether negative mood is consistently preceded or followed of mind-wandering. We saw it as important to measure mood both *before* and closely *after* mind-wandering using real-time, ecologically valid, reports. To this end, we used a newly developed smartphone application and software which made it possible to capture reports of mind-wandering and mood as they naturally occurred. We also extended previous research into the link between mind-wandering and negative mood in two ways. First, we measured two dimensions of mood, sadness (which has received the majority of attention to date) and anxiety, because these two dimensions represent major dimensions of affective well-being (Warr, 1990). Second, we measured three characteristics of mind-wandering: its affective content, time-orientation, and relevance to current life concerns. We reasoned that mind-wandering might not be directly linked with negative mood, in which case the characteristics of mind-wandering might provide an insight into the link between mind-wandering and negative mood. For example, negative mood might influence the characteristics of mind-wandering, which might then have an impact on later mood. We chose to examine these three characteristics because they are common to most instances of mind-wandering and have also been associated with negative mood in previous research. Below, we briefly explain how these characteristics of mind-wandering might be expected to be linked with negative mood.

1.2. *Negative mood and the affective content of mind-wandering*

Negative mood might colour the affective content of mind-wandering, for example, feeling sad before mind-wandering might lead to sad cognitions during mind-wandering. In this way, mood may act as a priming cue that makes mood-congruent cognitions more accessible (Isen, Shalcker, Clark, & Karp, 1978; Singer & Salovey, 1988). This might then exert a reciprocal influence on later mood, either maintaining or exacerbating negative feelings. Indeed recent research suggests that the link between mind-wandering and later negative mood may be indirect and explained by an increased accessibility of negative cognitions rather than mind-wandering *per se* (Marchetti, Koster, & De Raedt, 2012). Killingsworth and Gilbert's (2010) results also indicate that mood is associated with the affective content of mind-wandering. Participants were happier *at the moment* their minds wandered to pleasant topics and unhappier when they wandered to unpleasant topics. However, because happiness and affective content were measured *concurrently* it is unclear whether mood affected the valence of cognitions or vice versa, and whether mind-wandering content then had a lasting influence on feelings. Additionally, a more recent investigation also using experience sampling in daily life, found that the way that mind-wandering made participants feel (happy–sad, aroused–relaxed, excited–calm) mirrored feelings immediately prior to mind-wandering (Song & Wang, 2012). We might therefore expect the affective content of mind-wandering to be influenced by previous negative mood

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