



# Individual differences in self-consciousness and mind wandering: Further evidence for a dissociation between spontaneous and deliberate mind wandering



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## ABSTRACT

Recent research on individual differences in MW has consistently shown that spontaneous and deliberate MW can be distinguished being differentially associated with a number of psychological traits. The present study aimed to further investigate this distinction by investigating the associations between the two types of MW and two dispositional sub-types of self-consciousness, namely, self-rumination and self-reflection. Specifically, we specified a structural equation model in order to test the hypotheses that (1) self-rumination predicts spontaneous mind-wandering over and above neuroticism, and (2) self-reflection predicts deliberate mind-wandering over and above need for cognition (i.e., the tendency for an individual to engage in and enjoy thinking). Data were collected on 252 online participants. We found that while the spontaneous and deliberate MW were positively associated with each other, spontaneous MW was uniquely positively predicted by self-rumination, over and above neuroticism, whereas deliberate MW was uniquely positively predicted by self-reflection, over and above need for cognition. These results provide further support for the distinction between the two types of MW and suggest specific motivational dispositions for doing spontaneous and deliberate MW.

## 1. Introduction

At times we can all find our attention drifting away from an ongoing task (e.g. reading a book or attending a lecture) toward self-generated, personal inner thoughts and feelings, unrelated to the ongoing task. We refer to this shift in the focus of attention as ‘mind wandering’ (MW; Smallwood & Schooler, 2015).

Converging evidence suggests that MW is a ubiquitous and pervasive phenomenon with high intra-individual stability across short and long time periods (e.g. Killingsworth & Gilbert, 2010) and its thematic content is mostly driven, directly or indirectly, by the individual's goal or current life concerns, especially when taking an appropriate action toward the goal is not possible (Klinger, 1971).

Up until recently, MW has been considered as a unitary and homogeneous class of experiences (but see Giambra, 1995, for a different approach). However, during the last few years, an increasing number of studies has demonstrated the utility of the distinction between deliberate and spontaneous experiences of MW (see for a review, Seli, Risko, Smilek, & Schacter, 2016). In spontaneous MW, task-unrelated thoughts capture attention, triggering an uncontrolled shift from the task at hand to other trains of thoughts, whereas in deliberate

MW attention is intentionally shifted from the focal task toward internal thoughts. The difference between the two kinds of MW is in the process underlying the experience of MW, whether it comes to be spontaneously or, somehow, under individual's mental control.

Several studies have shown that trait-level tendencies to mind wander spontaneously and deliberately, although positively correlated, are differentially associated with a number of psychological traits. Specifically, evidence has been reported that high trait-level tendency to spontaneous MW may reflect difficulties in controlled processing: spontaneous but not deliberate MW was found to be associated with attention-deficit/hyperactivity disorder (ADHD) symptomatology (Seli, Smallwood, Cheyne, & Smilek, 2015), with higher reports of obsessive-compulsive disorder (OCD) symptoms (Seli, Risko, Purdon, & Smilek, 2016), and with self-reported fidgeting and self-reported propensity to act mindlessly (without awareness) (Carriere, Seli, & Smilek, 2013). Moreover, Seli, Carriere, and Smilek (2015) have shown that spontaneous and deliberate MW had opposing unique associations with some aspects of mindfulness: specifically, rates of deliberate mind wandering uniquely and positively predicted the tendency to be non-reactive to personal inner experiences, whereas spontaneous mind wandering negatively predicted the same dimension. In a very recent study on mind

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wandering and creativity, Agnoli, Vannucci, Pelagatti, and Corazza (accepted) showed that deliberate MW positively predicted originality at a divergent thinking task (i.e. Titles task), whereas spontaneous MW was negatively associated with originality.

In the present study, we aimed to go a step further in the investigation of the two kinds of MW, by addressing the question of their association with the dimension of private self-consciousness, namely, the tendency to be aware and attend to one's inner thoughts and feelings (Fenigstein, Scheier, & Buss, 1975).

Trapnell and Campbell (1999) distinguished between the rumination and reflection subtypes of private self-consciousness, based on the motivation underlying self-consciousness. Self-rumination is a kind of maladaptive, persistent, inflexible, and inappropriate self-consciousness that is motivated by neurotic motives, such as perceived threats and losses to the self. Self-reflection is an adaptive kind of inspection of one's own thoughts and feelings motivated by curiosity or epistemic interest in the self.

Several studies have shown that high levels of self-rumination are associated with high levels of neuroticism, psychological distress, depression, unhappiness of memories, and perceived impaired interpersonal skills (Joireman, Parrott, & Hammersla, 2002; Takano, Sakamoto, & Tanno, 2011; Teasdale & Green, 2004). On the contrary, high levels of self-reflection are associated with high levels of need for cognition, openness to experience, happiness, empathic concern, self-assertiveness, and relationship-maintenance skills (Takano et al., 2011; Trapnell & Campbell, 1999).

Given the relevance of the self in the experience of MW and the motivational role played by the individual's goals and current concerns in stimulating MW, one might argue that individual differences in trait levels of self-consciousness should positively predict the tendency to MW in everyday-life. Specifically, on the basis of the findings reviewed above about spontaneous and deliberate MW and self-rumination and self-reflection, we hypothesise that (1) the two dispositional sub-types of self-consciousness uniquely predict the two kinds of MW, with self-rumination predicting spontaneous MW and self-reflection predicting deliberate MW; (2) the two *specific* dispositions related to self-focused attention are more efficient in predicting individual differences in spontaneous and deliberate MW compared to their related *broader* traits of neuroticism and need for cognition. This result would rule out the hypothesis that the association between spontaneous MW and self-rumination, on the one hand, and between deliberate MW and self-reflection, on the other, is spurious, i.e., due to their being different facets of neuroticism and need for cognition, respectively. Hence, showing that the two specific sub-types of self-consciousness uniquely predict the two forms of MW while controlling for the effect of their two related and broader psychological traits (neuroticism and need for cognition) would suggest for the existence of two motivationally distinct dispositions related to self-focused attention underlying spontaneous and deliberate MW.

These hypotheses were tested using a structural equation model (SEM) specifying self-rumination, self-reflection, neuroticism, and need for cognition as predictors, and spontaneous and deliberate MW as criteria. We expected to find a significant direct effect of self-rumination (but not of neuroticism) on spontaneous MW and of self-reflection (but not of need for cognition) on deliberate MW. However, given the association of neuroticism with self-rumination and of need for cognition with self-reflection, we expect that the indirect effects of these broader traits on spontaneous and deliberate MW, respectively, would be significant.

## 2. Method

### 2.1. Participants

Participants were recruited online from the general population using a snowball-like system (for a detailed description of the procedure

see Section 1 of the Supplementary Materials [SM]). The final sample comprised 252 participants (Females: 69%, mean age  $26.76 \pm 8.67$  years, range 18–65).

### 2.2. Measures

**2.2.1. Mind wandering: spontaneous (MW-S) and mind wandering: deliberate (MW-D);** (Carriere et al., 2013; Italian version in Chiorri & Vannucci, 2017)

The MW-D and the MW-S are 4-item scales that assess individual differences in trait levels of spontaneous and deliberate MW, respectively. Items are scored using 7-point, Likert-type, frequency or intensity scales and participants are asked to select the answer that most accurately reflects their everyday MW. Higher scores reflect a greater tendency to mind wander spontaneously or deliberately. Previous studies reported adequate reliability and discriminant validity of the two scales (Carriere et al., 2013; Chiorri & Vannucci, 2017).

**2.2.2. Rumination-reflection questionnaire (RRQ, Trapnell & Campbell, 1999)**

The RRQ is a 24-item measure of self-rumination and self-reflection. The items are equally split across the two scales, with the items scored on a 5-point Likert-type scale, ranging from “strongly disagree” to “strongly agree”. Previous studies have shown adequate reliability and convergent validity of the RRQ (Trapnell & Campbell, 1999). Since no validated Italian version of the RRQ was available, we developed one and tested its psychometric properties, which were found to replicate those of the original version (see the Section 4 of the SM).

**2.2.3. Neuroticism subscale of the Big Five Inventory (BFI-N; John, Donahue, & Kentle, 1991; Italian version in Ubbiali, Chiorri, Hampton, & Donati, 2013)**

The BFI-N is an 8-item subscale of the BFI that assesses a range of negative affects, including anxiety, sadness, irritability, and nervous tension. Participants are asked to rate the degree to which each item applies to their personality on a 5-point, Likert-type scale. Previous studies reported adequate reliability and validity of this subscale (John, Naumann, & Soto, 2008; Ubbiali et al., 2013).

**2.2.4. Need for Cognition Scale (NfCS; Cacioppo, Petty, & Kao, 1984; Italian version in Chiesi & Primi, 2008)**

The NfCS is a 18-item scale that assesses an individual's preference for engaging in effortful cognitive and intellectual task and for dealing with situations that require thinking. The responses are scored using a 5-point Likert-type scale ranging from “extremely uncharacteristic” to “extremely characteristic”. Previous studies reported good reliability and construct validity (Cacioppo et al., 1984; Chiesi & Primi, 2008).

## 3. Results

In order to test whether self-rumination uniquely predicted spontaneous MW and self-reflection uniquely predicted deliberate MW while controlling for neuroticism and need for cognition, we specified a structural equation model (SEM) using parcels as manifest indicators for predictor latent variables, while we used the original items as indicators for the criterion variables. We used item parcels for the predictors to reduce the sample size to parameter ratio, as this ratio impacts the standard errors and stability of the estimates (see Section 2 of the SM for a rationale for the use of parceling in SEM). The correlation/covariance matrix of the observed variables is reported in Section 3 of the SM.

The model had an adequate fit ( $\chi^2(155) = 278.82$ ,  $p < 0.001$ , CFI = 0.95, TLI = 0.93, RMSEA = 0.06). Table 1 reports the regression and correlation coefficients for the latent variables. Consistent with the hypotheses, in the structural model only the regression coefficients of Deliberate MW on Reflection and of Spontaneous MW on Rumination

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