Psychology of Consciousness: Theory, Research, and Practice

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Online First Publication, August 24, 2026. https://dx.doi.org/10.1037/cns0000488

CITATION

Seli, P., Brosowsky, N. P., Ragnhildstveit, A., Carriere, J. S. A., & Smilek, D. (2026). Are individual differences in “unconstrained thought” meaningfully distinct from spontaneous and deliberate mind wandering? *Psychology of Consciousness: Theory, Research, and Practice*. Advance online publication. https://dx.doi.org/10.1037/cns0000488

AMERICAN PSYCHOLOGICAL ASSOCIATION
SOCIETY OF PSYCHOLOGICAL HYPNOSIS
Psychology of Consciousness: Theory, Research, and Practice

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ISSN: 2326-5523
https://doi.org/10.1037/cns0000488

Are Individual Differences in "Unconstrained Thought" Meaningfully Distinct From Spontaneous and Deliberate Mind Wandering?

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We constructed the Unconstrained Thought Questionnaire to assess trait-level unconstrained thought (or mind wandering), as described by the dynamic framework of thought. We aimed to empirically evaluate whether unconstrained thought, as defined and operationalized within the dynamic framework of thought, constitutes a trait construct that is meaningfully distinct from established trait-level measures of spontaneous (MW:S) and deliberate mind wandering. Using data from 2,350 participants, we conducted confirmatory factor analyses, which supported a three-factor structure, while also revealing a strong association between the Unconstrained Thought Questionnaire and MW:S at the latent level. Regression analyses show that the Unconstrained Thought Questionnaire was highly correlated with MW:S and contributed only modestly to the prediction of various psychological constructs, explaining less than 1% additional variance beyond MW:S and deliberate mind wandering. Taken together, these findings indicate that when the dynamic framework of thought's conceptualization of unconstrained thought is translated into a trait-level measure, it substantially overlaps with spontaneous mind wandering, which suggests that "unconstrained thought," as currently articulated, largely redescribes an already well-characterized phenomenon.

Keywords: mind wandering, unconstrained thought, deliberate mind wandering, spontaneous mind wandering

Supplemental materials: https://doi.org/10.1037/cns0000488.supp

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James (1890) observed that one of the fundamental "characteristics of thought" is that "within each personal consciousness thought is always changing" (p. 225). Along with others, such as the French psychologist Théodule-Armand Ribot (1890), James proposed that the contents of this ever-changing consciousness are determined by attentional selective mechanisms, which can be either passive and driven without effortful control ("spontaneous" in Ribot's view), or voluntary and driven by intention and effort ("artificial" in Ribot's view). James argued that attention can be engaged "passively for a time" by content we find interesting but that voluntary attention is fickler and

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The data and analytic code that support the findings of this study are publicly available on the Open Science Framework at Seli et al., 2026. The study materials are not publicly available because they form part of the University of Waterloo Psychology Department Mass Testing Survey, which is administered by the department and contains questionnaires contributed by multiple researchers. Descriptions of the questionnaires used in the present analyses are provided in the article. The authors have no known financial or personal relationships to declare that could have inappropriately influenced their work. This research was approved by the University of Waterloo Office of Research Ethics (Protocol No. 42635).

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that "[t]here is no such thing as voluntary attention sustained for more than a few seconds at a time" (p. 420). In proposing this view, he quoted Helmholtz, who wrote, "The natural tendency of attention when left to itself is to wander to ever new things" (James, 1890, p. 422).

These 19th-century observations regained popularity in recent years, receiving increased empirical scrutiny, particularly in the rapidly growing research area focused on the general concept of mind wandering. Echoing James's and Helmholtz's observations, this research area was based on experimental findings showing that people often report that their attention shifts to thoughts that are unrelated to a task they are attempting to complete (see Smallwood & Schooler, 2006, 2015, for reviews). While efforts to define the concept of mind wandering are ongoing, it is perhaps best construed as a natural category with fuzzy boundaries, which is characterized by a family-resemblance structure (Seli et al., 2018) wherein prototypical cases can be identified based on their values along several critical dimensions, including, for instance, primary-task relatedness (Smallwood & Schooler, 2006) and stimulus dependence (Stawarczyk et al., 2014).

One central distinction that has emerged in the mind-wandering literature—and which builds on Ribot's and James's contrast between passive/spontaneous and voluntary/artificial attention—is the distinction between spontaneous and deliberate mind wandering (e.g., Carriere et al., 2013; Shaw & Giambra, 1993; see Seli et al., 2016, for a review). Spontaneous mind wandering, on the one hand, occurs unintentionally, and its associated thoughts are guided without agentic effort. Deliberate mind wandering, on the other hand, occurs intentionally, and its thought content is associated with a sense of agency. These two types of mind wandering not only manifest at different moments during task performance (Seli, Ralph, et al., 2017) but seem to characterize two distinct traits (Seli et al., 2016). Indeed, across numerous studies, researchers have found dissociations of the two. For instance, whereas spontaneous mind wandering is positively associated with posttraumatic stress disorder (PTSD) symptomology, deliberate mind wandering shows an opposite, negative association with PTSD (Brosowsky et al., 2022). Similarly, whereas people who more frequently engage in spontaneous mind wandering tend to display lower levels of mindfulness (specifically, they are more reactive to inner experiences), the opposite is true for those who frequently engage in deliberate mind wandering (Seli, Carriere, et al., 2015). Corroborating these behavioral dissociations, research has also indicated that these two types of mind wandering show distinct neural signatures (e.g., Golchert et al., 2017).

Although the distinction between spontaneous and deliberate mind wandering has proven useful for characterizing different forms of thought, it was not originally intended to foreground the moment-to-moment dynamics by which thoughts unfold and transition over time. In particular, while spontaneous mind wandering, as operationalized in prior work, indexes aspects of unintentionality, lack of control, and topic-to-topic shifting (Carriere et al., 2013), these features are embedded within a broader distinction centered on intentionality and agency rather than on the dynamics of thought movement themselves. As a result, questions about how freely thoughts move, how variable they are, and how such movement is constrained remain only indirectly addressed within this framework.

Drawing on this broader concern with the dynamic nature of conscious experience—and returning to James's (1890) characterization of consciousness as a continuously changing stream—Christoff et al. (2016) proposed a perspective that highlights the dynamics of thought itself. Indeed, Christoff et al. argued that the dynamics of thought can vary along a dimension of freedom of movement, whereby thoughts can be (a) highly variable on the one extreme, shifting freely from topic to topic, and (b) lacking freedom of movement, on the other extreme, with a relatively fixed focus on a specific idea or topic. According to this model, which they called the dynamic framework of thought (DFT), constraints on the movement of thought can be imposed either deliberately or automatically. The framework further posits that mind wandering "tends to be more-deliberately constrained than dreaming, but less-deliberately constrained than creative thinking and goal-directed thought" (Christoff et al., 2016, p. 719). Although the DFT includes both deliberate and automatic control mechanisms that are reminiscent of prior distinctions between spontaneous and deliberate mind wandering (e.g., Carriere et al., 2013; Shaw & Giambra, 1993), Christoff et al. further argued that the degree of thought movement ought to be treated as a primary

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dimension for understanding mind wandering in particular and spontaneous thought in general.[1]

Notably, however, the emphasis on spontaneity and lack of constraint in the DFT closely parallels earlier theoretical and empirical distinctions between spontaneous and deliberate mind wandering. Indeed, prior to the introduction of the DFT, spontaneous mind wandering was explicitly defined as a thought that arises unintentionally, unfolds without agentic control, and transitions freely from one topic to another (e.g., Carriere et al., 2013; Shaw & Giambra, 1993). Despite these conceptual similarities, the DFT did not explicitly situate its proposed dimension of thought constraint within this prior literature, leaving open the question of whether unconstrained thought, as defined within the framework, constitutes a genuinely distinct construct or instead redescribes an already well-established dimension of spontaneous mind wandering.

Shortly after the publication of the DFT (Christoff et al., 2016), Mills et al. (2018) provided the first explicit operationalization of the framework's notion of unconstrained thought at the state level, translating the DFT's theoretical claims about freedom of movement into concrete experience-sampling items. In their study, participants were asked to respond to questions, presented on their mobile devices, about the nature of their thoughts during their daily routines. Specifically, participants were asked about whether their "mind was moving about freely," whether they were "thinking about something other than what [they] were doing" and whether they were "aware of [their] surroundings" (p. 22). Critically, Mills et al. found significant but weak relations between responses about freedom of movement and responses about task relatedness, suggesting that the two dimensions were related, but not identical (see also O'Neill et al., 2021).

While the available evidence suggests that the dimension of thought constraint is somewhat distinct from the dimension of task relatedness, what remains unclear is whether the thought-constraint dimension adds useful explanatory power beyond prior conceptualizations and measures of spontaneous and deliberate mind wandering (e.g., Carriere et al., 2013; Shaw & Giambra, 1993). Indeed, as argued by the DFT (Christoff et al., 2016), thought constraint is governed by automatic (i.e., spontaneous) and deliberate control processes, as are spontaneous and deliberate mind wandering, respectively. Thus, on conceptual grounds alone, the DFT's thought-constraint dimension may substantially overlap with existing measures of spontaneous and deliberate mind wandering, raising questions about whether it offers novel explanatory value. Moreover, the gold-standard trait measure used to assess spontaneous mind wandering—the Mind Wandering Scale: spontaneous (MW:S; Carriere et al., 2013)—includes, among its four questions, one question that directly targets thought constraint: "When I mind-wander, my thoughts tend to be pulled from topic to topic." This provides some reason to suspect that any research employing the MW:S may have already indexed the thought-constraint dimension of mind wandering that was later proposed by the DFT.

Accordingly, what is needed is a direct assessment of the extent to which the thought-constraint dimension proposed by the DFT predicts variables of theoretical interest (e.g., ADHD) independently of existing measures of spontaneous and deliberate mind wandering, that is, whether thought constraint contributes unique variance beyond these established constructs. To this end, here we sought to measure trait-levels of spontaneous and deliberate mind wandering—using existing measures of these constructs (Carriere et al., 2013)—and to determine whether a trait-level measure of unconstrained thought provides unique explanatory power when examining the relations among spontaneous and deliberate mind wandering with numerous variables, many of which have already shown established relationships with spontaneous and/or deliberate mind wandering (e.g., ADHD, obsessive–compulsive disorder [OCD], PTSD).

At present, however, no trait-level measure exists that allows for a direct empirical test of whether unconstrained thought, as defined within the DFT, can be distinguished from spontaneous

[1] In the vast majority of their empirical work, the creators of the DFT have examined only a single dimension of freedom of movement (e.g., Mills et al., 2018; Alperin et al., 2021). One exception is Kam et al. (2021), who attempted to measure freedom of movement as a separate dimension from the dimensions of deliberate and automatic constraints. However, their methodology complicates the framework by treating freely moving thought as distinct from these constraints while simultaneously defining it in terms of them. Given this complication, we reasoned that, in the present work, it is more productive to focus on freedom of movement as the primary dimension, as has been done in the majority of research within the dynamic framework (e.g., Alperin et al., 2021; Mills et al., 2018).

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and deliberate mind wandering at the level of individual differences. What is needed, then, is a trait-level measure that faithfully reflects how unconstrained thought has been defined and operationalized within the DFT itself. To this end, we turned to Mills et al. (2018), whose study provided the first explicit operational definition of unconstrained thought at the state level. In that work, unconstrained thoughts were described for participants using the following definitional characteristics:

- "They seem to wander around, flowing from one thing to another."
- "There is no overarching purpose or direction to your thinking. Although there may still be some connection between one thought and the next."
- "Images and memories seem to spontaneously come into your mind."
- "Your attention lands spontaneously on things in your environment."
- "Your mind may spontaneously drift between things in the external environment and internal images so it may go back and forth."
- "Your thoughts move freely when it feels like your thoughts could land on pretty much anything."
- "Your thoughts seem to flow with ease."

Notably, several of these definitional features emphasize spontaneity, lack of overarching direction, and freely transitioning thought content: features that closely resemble prior characterizations of spontaneous mind wandering, which has long been defined as thought that arises unintentionally, unfolds without agentic control, and shifts freely from one topic to another (e.g., Carriere et al., 2013; Shaw & Giambra, 1993). This resemblance is theoretically consequential: Indeed, if unconstrained thought is to be treated as a distinct dimension of conscious experience, then a trait-level measure derived directly from this definition should demonstrate discriminant validity relative to established measures of spontaneous and deliberate mind wandering. Thus, rather than attempting to refine or reinterpret this definition, we retained its defining features intentionally. Specifically, we constructed a seven-item trait-level scale—the Unconstrained Thought Questionnaire (UTQ)—with each item corresponding directly to one of the definitional characteristics articulated by Mills et al. (2018). This approach allowed us to directly evaluate whether the DFT's conceptualization of unconstrained thought gives rise to a trait-level construct that is empirically distinct from spontaneous and deliberate mind wandering.

With this measure in hand, the present study had two primary aims. First, we sought to examine whether the UTQ measures a unitary construct that is distinct from the constructs indexed by the MW:S and Mind Wandering Scale: deliberate (MW:D). To address this aim, we initially conducted a confirmatory factor analysis to test whether the items from each scale—the UTQ, MW:S, and MW:D—clustered independently to form distinct factors. Specifically, we examined whether all items from the UTQ formed one factor, all items from MW:S formed a second factor, and all items from MW:D formed a third factor, with no cross-loading of items between these factors.

Our second aim was to determine whether the UTQ provides substantive explanatory power above and beyond the existing trait measures of spontaneous and deliberate mind-wandering scales when predicting other measures of theoretical interest. To this end the UTQ, MW:S, and the MW:D were administered in a large-sample study (N = 2,350) in which participants also completed a series of other scales that index variables of theoretical interest within the mind-wandering literature. The scales included measured various aspects of affective dysfunction and regulation (depression, anxiety, and stress, emotional reactivity, PTSD), various clinical disorders that include problems of control (OCD, eating disorders, attention deficits), as well as other variables known to be related to mind wandering—specifically, impulse control, deep effortless concentration, and boredom proneness. A description of each of the measures used can be found below, together with each measure's known or hypothesized relation to the MW:S and the MW:D. We then conducted regression analyses predicting each of the measures of interest to examine whether the UTQ explained variance in the measure over and above the variance explained by the MW:S and the MW:D.

Method

This study was approved by the University of Waterloo's Office of Research Ethics (ORE; Protocol Number: 42635). All participants provided informed consent before taking part in the study.

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Procedure

Participants were undergraduate psychology students at the University of Waterloo, in Canada, who completed the Psychology Department's 2019 Mass Testing Survey. This survey comprised a variety of psychological scales contributed by various researchers from the University of Waterloo's Psychology Department. It was administered during the first 8 weeks of the fall semester, and made available online, via Qualtrics. Students who partook in the survey received partial credit in their psychology courses. Participants completed every item of each scale included in the survey, which were presented in a randomized order. For the purposes of this study, only those scales theoretically relevant to mind-wandering measures were analyzed.

Measures

UTQ

The UTQ is a 7-item measure of thought constraint that was constructed for the present study and based directly on Mills et al.'s (2018) seven defining features of unconstrained thought (see Supplemental Materials for the full scale). Items are rated on a 7-point scale, anchored by *almost never* (1) and *almost always* (7). The UTQ is scored by averaging across all items. Higher scores reflect greater levels of unconstrained thoughts.

MW:D/MW:S

The MW:D/MW:S is an 8-item measure of mind wandering, typically showing good internal consistency (α = .83–.84; Carriere et al., 2013; Seli et al., 2016). It consists of two factors (with 4 items per factor) that measure deliberate (intentional) and spontaneous (unintentional) mind wandering. Items for both scales are rated on a 7-point scale, anchored by *rarely* (1) and *a lot* (7). The MW:D/MW:S is scored by averaging across all items. Total scores per factor range from 7 to 28, with higher scores denoting greater deliberate and spontaneous mind wandering.

Depression Anxiety Stress Scale

The Depression Anxiety Stress Scale is a 21-item measure of negative emotional states, consisting of three factors: depression (α = .88), anxiety (α = .82), and stress (α = .90), each typically showing good internal consistency (Henry & Crawford, 2005). Items are rated on a 4-point scale, anchored by *did not apply to me at all* (0) and *applied to me very much or most of the time* (3), in respect to the past week. Total scores per factor range from 0 to 42, with higher scores reflecting greater negative emotions. Prior work shows negative and positive relations to deliberate (depression: sr = −0.06 to 0.09, ps < .01–.001; anxiety: sr = −0.05 to 0.10, ps < .05–.001; stress: sr = −0.08 to 0.14, ps < .001) and spontaneous (depression: sr = 0.40–0.41, ps < .001; anxiety: sr = 0.35–0.40, ps < .001; stress: sr = 0.42–0.43, ps < .001) mind wandering, respectively (Seli et al., 2019).

Adult ADHD Self-Report Scale Screener

The Adult ADHD Self-Report Scale Screener is a 6-item measure of attention-deficit/hyperactivity disorder (ADHD) symptoms, typically showing good internal consistency (α = .88; Kessler et al., 2005). Items are rated on a 5-point scale, anchored by *never* (0/1) and *often* (0/1), in respect to the past 6 months. The Adult ADHD Self-Report Scale Screener is scored by summing all items together, producing a diagnostic. Total scores range from 0 to 6, with higher scores indicating greater ADHD severity. Prior work shows a positive relation to deliberate (sr = 0.03–0.07, ps = .01–.18) and spontaneous (sr = 0.40–0.74, ps < .001) mind wandering, (Seli, Smallwood, et al., 2015).

Brief Self Control Scale

The Brief Self Control Scale is a 13-item measure of self-control, typically showing good internal consistency (α = .83−.85; Tangney et al., 2004). It consists of a single, unidimensional factor. Items are rated on a 5-point scale, anchored by *not at all* (1) and *extremely* (5), in respect to general behaviors. The Brief Self Control Scale is scored by summing all items together. Total scores range from 13 to 65, with higher scores reflecting greater self-control. Prior work shows negative relations to deliberate (r = −0.24, p < .001) and spontaneous (r = −0.43, p < .001) mind wandering, respectively (Brosowsky et al., 2022).

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Boredom Proneness Scale Short Form

The Boredom Proneness Scale Short Form is an eight-item measure of boredom, typically showing good internal consistency ($\alpha = .88$; Struk et al., 2017). It comprises a single, unidimensional factor. Items are rated on a 7-point scale, anchored by *strongly disagree* (1) and *strongly agree* (7), in respect to general feelings. The Boredom Proneness Scale Short Form is scored by summing all items together. Total scores range from 8 to 56, with higher scores reflecting greater boredom. Prior work shows positive relations to deliberate ($r = 0.25$, $p < .001$) and spontaneous ($r = 0.55$, $p < .001$) mind wandering (Martarelli et al., 2021).

Dimensional Obsessive–Compulsive Scale

The Dimensional Obsessive–Compulsive Scale is a 20-item measure of OCD symptoms, typically showing good internal consistency ($\alpha = .90$; Abramowitz et al., 2010). It consists of four factors: "contamination," "responsibility for harm," "unacceptable thoughts," and "symmetry." Items are rated on a 5-point scale, anchored by "no symptom" (0) and "extreme symptom" (4), in respect to the past month. The Dimensional Obsessive–Compulsive Scale is scored by summing items within each factor, as well as all items together. Total scores range from 0 to 80, with higher scores indicating greater OCD severity. Prior work shows a positive relation to spontaneous ($\beta s = 0.14$ –0.37, $ps < .001$), but not deliberate ($\beta s = -0.04$–0.02, $ps > .05$), mind wandering (Seli, Risko, et al., 2017).

Eating Disorder Diagnostic Scale DSM-5

The Eating Disorder Diagnostic Scale *DSM-5* is a 22-item measure of eating disorder (ED) symptoms, spanning body image, eating habits, and compensatory behaviors, typically showing excellent internal consistency ($\alpha = .91$; Stice et al., 2000). It comprises three factors that reflect ED diagnoses, namely "anorexia nervosa," "bulimia nervosa," and "binge eating disorder." Most items are rated on a 7-point scale, anchored by "not at all" (0) and "extremely" (6), in respect to the past 3–6 months. Other items use dichotomous, frequency, and open-ended questions. The Eating Disorder Diagnostic Scale *DSM-5* is typically scored via computer algorithms, producing a diagnostic (part A) and composite symptom (part B) score. These outputs signal the presence of EDs and the degree of eating pathology respectively. Prior work shows a positive relation to spontaneous ($\beta = 0.14$, $p < .001$), but not deliberate ($\beta = -0.04$, $p = .058$), mind wandering (A. C. Smith et al., 2023).

Emotional Reactivity Scale

The ERS is a 21-item measure of emotional reactivity, typically showing excellent internal consistency ($\alpha = .94$; Nock et al., 2008). It consists of three factors: "sensitivity," "intensity," and "persistence." Items are rated on a 5-point scale, anchored by "not at all like me" (0) and "completely like me" (4), in respect to general feelings. The ERS is scored by summing items within each factor, as well as all items together. Total scores range from 0 to 84, with higher scores reflecting greater emotional reactivity. To the best of our knowledge, there is no literature on the relationship between the ERS and either deliberate or spontaneous mind wandering.

Posttraumatic Stress Disorder Checklist for DSM-5

The Posttraumatic Stress Disorder Checklist for *DSM-5* is a 20-item measure of PTSD symptoms, typically showing excellent internal consistency ($\alpha = .94$–$.95$; Blevins et al., 2015). It consists of four factors: "thought intrusion," "stimuli avoidance," "negative cognitions/mood," and "altered reactivity." Items are rated on a 5-point scale, anchored by "not at all" (0) and "extremely" (4), in respect to the past month. The Posttraumatic Stress Disorder Checklist for *DSM-5* is scored by summing items within each factor, as well as all items together. Total scores range from 0 to 80, with higher scores indicating greater PTSD severity. Prior work shows negative and positive relations to deliberate ($\beta = -0.07$, $p < .001$) and spontaneous ($\beta = 0.32$, $p < .001$) mind wandering, respectively (Brosowsky et al., 2022).

Data Availability

The data set and analytic code used in this study are publicly available on the Open Science Framework at https://osf.io/r427v/ (Seli et al., 2026). The questionnaires were administered as part of the University of Waterloo Psychology

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Department Mass Testing Survey and cannot be redistributed; descriptions of the measures are provided in the article.

Results

The results are described in three sections. First, we report the results of a factor analysis conducted to assess whether the UTQ forms a distinct factor, separate from the MW:S and MW:D. Second, we present descriptive statistics for each measure together with correlations among measures. Finally, we report regression analyses examining whether the UTQ explains unique variance in various measures over and above the variance explained by the MW:S and MW:D.

Confirmatory Factor Analysis

To determine whether the UTQ is distinct from the MW:S and the MW:D, the responses to the individual items from these three measures were submitted to a confirmatory factor analysis using jamovi Version 2.3.21 (The jamovi Project, 2023). To address the potential replicability of the factor analysis results, the total sample was first randomly divided into two, each comprising 1,175 participants (Subsample 1 $M_{age} = 20.0$, $SD = 2.97$, female = 76.4%; Subsample 2 $M_{age} = 19.9$, $SD = 3.02$, female = 76.8%). The factor loadings for each of the items, for both subsamples, are shown in Table 1. The table shows that the items from each of the measures loaded well on their respective factors, while the UTQ, MW:D, and MW:S factors also all correlated very well in both subsamples. For both subsamples, the confirmatory model fits were acceptable but not optimal, depending on which statistic is considered most valid (Subsample 1: $\chi^2 = 616.8$, $p < .001$; CFI = .950; TLI = .939, RMSEA = .073, 95% CI [.067, .078]; Subsample 2: $\chi^2 = 635.1$, $p < .001$; CFI = .950; TLI = .940, RMSEA = .074, 95% [CI .069, .080]). Notably, for both subsamples all of the model fit statistics could be improved substantially by accounting for strong residual covariances between items within a single questionnaire, and residual covariances were not required across questionnaires (e.g., for Subsample 1, accounting for large residuals between Item 1 and Item 2 and Item 2 and item 4 of the MW:D as well as between Item 3 and Item 4 and Item 5 and Item 6 of the UTQ and finally between Item 3 and Item 4 of the MW:S resulted in much improved fit statistics: $\chi^2 = 392.0$, $p < .001$; CFI = .971; TLI = .962, RMSEA = .057, 95% [CI .052, .063]). All together, these results suggest that it is reasonable to view the UTQ, MW:S, and MW:D as indexing separate but highly related constructs.

In response to concerns about the confirmatory modeling approach, we also conducted an exploratory factor analysis (EFA) including all UTQ, MW:S, and MW:D items simultaneously, allowing item loadings to emerge without confirmatory constraints. The EFA supported a three-factor solution. Parallel analysis occasionally suggested a fourth factor; however, this factor was unstable and defined by a single item. When a three-factor solution was retained, MW:D items formed a relatively distinct factor, whereas UTQ items showed substantial overlap with spontaneous mind wandering. Consistent with the CFA, the latent association between the UTQ and MW:S factors was high ($r = 0.69$), indicating strong similarity despite statistical separability. Full EFA results are reported in the Supplemental Materials.

Descriptive Statistics and Correlations

The descriptive statistics for each measure are shown in Table 2, and for the sake of completeness, the correlations among measures are shown in Table 3. As shown in Table 2, each of the measures had acceptable distributions and internal consistencies; this was also the case for the UTQ, which emerged as a coherent measure. Table 3 shows that the MW:S, MW:D and the UTQ were correlated with each other and that they were significantly correlated with all of the other measures included in our study.

Notably, using Hittner et al.'s (2003; see also Zou, 2007) z procedure for testing overlapping correlations based on dependent groups, our analyses revealed that the correlation between the UTQ and MW:S was significantly higher ($r = 0.69$) than the correlation between the UTQ and MW:D ($r = 0.39$), $\Delta r = 0.3$, 95% CI [0.26, 0.33], $z = 17.16$, $p < .001$

Regression Analyses

To assess whether the UTQ provides any additional explanatory power beyond that of the MWS and MWD scales, we conducted a series of hierarchical regression analyses with two steps. In the first step, we predicted a dependent variable

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Table 1

Standardized Factor Loadings and Confidence Intervals for the UTQ, MW:D, and MW:S As Well As Standardized Covariances Among the UTQ, MW:D, and MW:S for Two Subsamples

		Subsample 1		Subsample 2		Subsample 1		Subsample 2	
Factor	Indicator	Estimate	95% CI	Estimate	95% CI	MW:D	MW:S	MW:D	MW:S
UTQ	Item 1	.764	[.714, .814]	.789	[.740, .839]	.422	.745	.433	.768
	Item 2	.692	[.640, .744]	.686	[.634, .739]				
	Item 3	.753	[.702, .804]	.780	[.730, .830]				
	Item 4	.814	[.765, .863]	.830	[.782, .879]				
	Item 5	.795	[.745, .844]	.797	[.748, .847]				
	Item 6	.741	[.690, .792]	.730	[.679, .782]				
	Item 7	.677	[.624, .729]	.737	[.685, .788]				
MW:D	Item 1	.747	[.696, .799]	.710	[.657, .762]		.477		.531
	Item 2	.883	[.835, .930]	.885	[.837, .932]				
	Item 3	.848	[.800, .897]	.857	[.808, .905]				
	Item 4	.755	[.704, .807]	.770	[.719, .821]				
MW:S	Item 1	.875	[.828, .922]	.883	[.836, .930]	.477		.531	
	Item 2	.823	[.774, .872]	.839	[.791, .888]				
	Item 3	.738	[.687, .790]	.730	[.678, .781]				
	Item 4	.802	[.752, .851]	.803	[.753, .853]				

Note. The full sample $N = 2{,}350$, while for these analyses $n_1 = 1{,}151$, and $n_2 = 1{,}137$ after dividing into two and then filtering out any participants who did not answer all 15 items. All ps $< .001$. UTQ = Unconstrained Thought Questionnaire; MW:D = Mind Wandering Scale: deliberate; MW:S = Mind Wandering Scale: spontaneous; CI = confidence interval.

Table 2
Descriptive Statistics and Internal Consistency Estimates for All Study Measures

Measure	*N*	*M*	*SD*	Skew	Kurtosis	α
1. MW:S	2,302	4.11	1.38	−0.08	2.65	.89
2. MW:D	2,305	4.25	1.44	−0.16	2.51	.88
3. UTQ	2,295	4.23	1.22	−0.11	2.93	.90
4. DASS-D	2,296	0.80	0.75	0.98	3.09	.92
5. DASS-A	2,296	0.74	0.68	1.01	3.39	.87
6. DASS-S	2,296	0.92	0.68	0.60	2.65	.86
7. ASRS	2,300	2.87	0.66	0.11	3.32	.71
8. BPS	2,347	3.39	1.09	0.34	2.59	.89
9. BSCS	2,326	3.10	0.68	0.06	2.78	.53
10. DOCS	2,286	13.36	10.71	0.98	3.75	.93
11. EDDS	1,911	0.00	1.00	−0.21	1.76	.90
12. ERS	2,270	2.62	0.94	0.36	2.47	.96
13. PCL	2,268	42.41	17.65	0.70	2.71	.96
14. DEC	2,295	4.15	1.10	−0.05	2.85	.96

Note. MW:S = Mind Wandering Scale: spontaneous; MW:D = Mind Wandering Scale: deliberate; UTQ = Unconstrained Thought Questionnaire; ASRS = Adult Attention-Deficit/Hyperactivity Disorder Self-Report Scale; BPS = Boredom Proneness Scale; BSCS = Brief Self Control Scale; DOCS = Dimensional Obsessive–Compulsive Scale; EDDS = Eating Disorder Diagnostic Scale; ERS = Emotional Reactivity Scale; PCL = Posttraumatic Stress Disorder Checklist; DEC = Deep Effortless Concentration; DASS-D = Depression Anxiety Stress Scales–Depression; DASS-A = Depression Anxiety Stress Scales–Anxiety; DASS-S = Depression Anxiety Stress Scales–Stress.

with the MWS and the MWD scales (Model 1; M1). In the second step, we added the UTQ as a predictor (Model 2; M2). A summary of the results of interest is illustrated in Figures 1 and 2, where the standardized beta coefficients are plotted for the MWS and UTQ from model 2 (Figure 1) and the adjusted *R*-squared for Models 1 and 2, and the difference between models are plotted (Figure 2). The 95% confidence interval for the difference in *R*-squared was estimated using a bootstrap resampling procedure using 5,000 random draws. The full model results can be found in the Supplemental Materials.

From the analyses, two discernible patterns emerged: First, the UTQ showed capability in significantly predicting the dependent variable in numerous instances. However, the amount of variance explained by the UTQ was consistently smaller than the amount of variance explained by the MWS scale. Interestingly, the UTQ did not demonstrate significant predictive power over and above the MW:S and MW:D for any of the cognitive control-associated constructs measured by the Brief Self-Control Scale, and both the external/internal facets of the deep effortless attention scales. Second, when the UTQ was included in the model, it often explained less than 1% unique additional variance in the dependent measure, even when it was a significant unique predictor.

To assess whether the regression findings were sensitive to the factor-analytic approach, we also conducted parallel regression analyses using factor scores derived from the EFA. These analyses mirrored the primary hierarchical regressions reported above, with MW:S and MW:D

Table 3
Pearson Correlations Among All Study Measures

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. MW:S	—													
2. MW:D	.44*	—												
3. UTQ	.69*	.39*	—											
4. DASS-D	.39*	.13*	.28*	—										
5. DASS-A	.38*	.14*	.32*	.71*	—									
6. DASS-S	.40*	.12*	.32*	.75*	.79*	—								
7. ASRS	.47*	.22*	.39*	.40*	.38*	.42*	—							
8. BPS	.40*	.16*	.31*	.60*	.44*	.46*	.46*	—						
9. BSCS	−.45*	−.25*	−.33*	−.39*	−.28*	−.32*	−.51*	−.52*	—					
10. DOCS	.30*	.08*	.26*	.40*	.48*	.46*	.29*	.28*	−.18*	—				
11. EDDS	.20*	.09*	.15*	.28*	.30*	.31*	.21*	.21*	−.23*	.18*	—			
12. ERS	.39*	.13*	.35*	.50*	.55*	.63*	.34*	.39*	−.32*	.42*	.32*	—		
13. PCL	.42*	.11*	.35*	.67*	.67*	.66*	.41*	.48*	−.35*	.53*	.30*	.59*	—	
14. DEC	−.30*	.01	−.15*	−.29*	−.23*	−.25*	−.35*	−.36*	.45*	−.11*	−.17*	−.20*	−.26*	—

Note. MW:S = Mind Wandering Scale: spontaneous; MW:D = Mind Wandering Scale: deliberate; UTQ = Unconstrained Thought Questionnaire; ASRS = Adult Attention-Deficit/Hyperactivity Disorder Self-Report Scale; BPS = Boredom Proneness Scale; BSCS = Brief Self Control Scale; DOCS = Dimensional Obsessive–Compulsive Scale; EDDS = Eating Disorder Diagnostic Scale; ERS = Emotional Reactivity Scale; PCL = Posttraumatic Stress Disorder Checklist; DEC = Deep Effortless Concentration; DASS-D = Depression Anxiety Stress Scales–Depression; DASS-A = Depression Anxiety Stress Scales–Anxiety; DASS-S = Depression Anxiety Stress Scales–Stress.
* $p < .05$.

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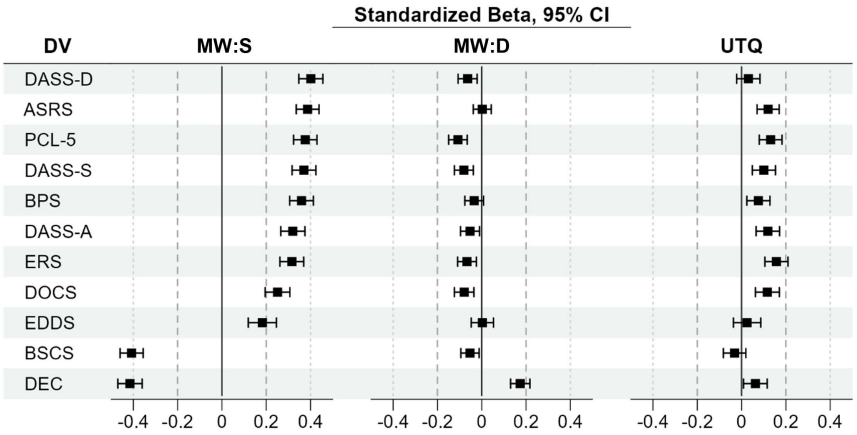
Figure 1
Standardized Regression Coefficients Across Outcome Measures



Note. This figure illustrates the standardized beta coefficients from the linear regression models predicting a DV with the MW:S and MW:D scales, as well as the UTQ. The DVs are ordered based on their standardized β coefficients, from most positive to most negative. DV = dependent variable; MW:S = Mind Wandering Scale: spontaneous; MW:D = Mind Wandering Scale: deliberate; UTQ = Unconstrained Thought Questionnaire; CI = confidence interval; ASRS = Adult Attention-Deficit/Hyperactivity Self-Report Scale; BPS = Boredom Proneness Scale; BSCS = Brief Self Control Scale; DOCS = Dimensional Obsessive–Compulsive Scale; EDDS = Eating Disorder Diagnostic Scale; ERS = Emotional Reactivity Scale; PCL-5 = Posttraumatic Stress Disorder Checklist for *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition; DEC = Deep Effortless Concentration; DASS-D = Depression Anxiety Stress Scales–Depression; DASS-A = Depression Anxiety Stress Scales–Anxiety; DASS-S = Depression Anxiety Stress Scales–Stress. See the online article for the color version of this figure.

entered in the first step and the UTQ factor added in the second step. The results were nearly identical to those obtained using the scale scores: The UTQ did not consistently predict outcomes, and when it did, its effects were substantially smaller than those of spontaneous mind wandering and accounted for less than 1% additional explained variance. Full results of the EFA-based regression analyses are reported in the Supplemental Materials.

Discussion

We began our investigation by constructing the UTQ, directly based on Mills et al.'s (2018) definitional statements about unconstrained thought. We then analyzed data from a large sample of participants who completed the UTQ, measures of spontaneous and deliberate mind wandering (MW:S and MW:D, respectively), and a series of scales indexing constructs theoretically related to mind wandering. Our analyses indicated that the UTQ, MW:S, and MW:D are best construed as measuring related but distinguishable aspects of conscious thought. At the same time, the UTQ showed a particularly strong overlap with MW:S, with more modest overlap with MW:D. Importantly, the UTQ did not account for meaningful additional variance beyond MW:S and MW:D when predicting measures of self-control and attention-related functioning, and it uniquely explained less than 1% of the variance in measures of affective regulation, affective dysfunction, and several control-related clinical traits. Notably, our ability to detect even these small effects is likely attributable to the large sample size used in the present study. Taken together, these findings suggest that although unconstrained thought may capture a slightly different aspect of experience than spontaneous and deliberate mind wandering, it contributes little additional explanatory value beyond established measures of mind wandering.

In light of these findings, we recommend that researchers examining the unconstrained thought dimension of conscious experience exercise caution in interpreting results, particularly in studies wherein unconstrained thought is measured in isolation. In such cases, it is difficult to determine

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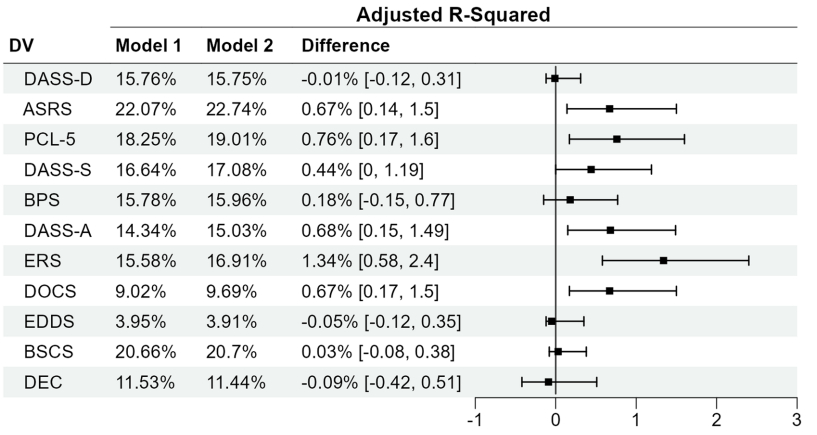
Figure 2

Adjusted R-Squared for Models 1 and 2 and the Difference Between the Two



Note. Comparison of variance explained by regression models with and without the Unconstrained Thought Questionnaire variable. The figure shows the percentage of variance (adjusted r squared) accounted for by two regression models: Model 1, which includes only the Mind Wandering Scale: spontaneous and Mind Wandering Scale: deliberate variables, and Model 2, which includes Mind Wandering Scale: spontaneous, Mind Wandering Scale: deliberate, and Unconstrained Thought Questionnaire. The difference in R squared between the two models is represented by the bar, with error bars indicating the 95% confidence interval estimated using a bootstrap resampling procedure with 5,000 iterations. This figure highlights the additional explanatory power gained by incorporating the Unconstrained Thought Questionnaire variable into the regression model. DV = dependent variable; ASRS = Adult Attention-Deficit/Hyperactivity Disorder Self-Report Scale; PCL-5 = Posttraumatic Stress Disorder Checklist for *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition; ERS = Emotional Reactivity Scale; DOCS = Dimensional Obsessive–Compulsive Scale; BPS = Boredom Proneness Scale; BSCS = Brief Self Control Scale; EDDS = Eating Disorder Diagnostic Scale; DEC = Deep Effortless Concentration; DASS-D = Depression Anxiety Stress Scales–Depression; DASS-A = Depression Anxiety Stress Scales–Anxiety; DASS-S = Depression Anxiety Stress Scales–Stress. See the online article for the color version of this figure.

whether observed associations reflect variance that is unique to unconstrained thought or variance that is better attributed to spontaneous or deliberate mind wandering. Moving forward, we suggest that unconstrained thought should be assessed alongside other established dimensions of mind wandering, and more broadly alongside other dimensions used to characterize ongoing thought, to permit clearer conclusions about the unique and shared contributions of these constructs.

Consistent with this recommendation, it is worth noting that several recent efforts have moved toward measuring multiple aspects of mind wandering simultaneously. For example, López et al. (2023) developed a four-factor questionnaire assessing "failures in social interaction," "failures in interaction with objects," "unawareness," and "inattention." Although this scale benefits from its broad scope, a notable limitation is that its items extend beyond mind wandering per se to include a range of attention-related and cognitive failure constructs. As the authors themselves noted (López et al., p. 442), items were intentionally designed to capture intrusive thoughts, rumination, cognitive errors, unmindful attention, and unawareness. A more focused alternative is the Brief Mind Wandering Three-Factor Scale (Schubert et al., 2023), which distinguishes between unintentional mind wandering, intentional mind wandering, and meta-awareness. As expected, the unintentional factor correlates strongly with MW:S, the intentional factor aligns with MW:D, and the meta-awareness factor shows a negative relation with MW:S and little relation to MW:D. Together, these scales reflect a growing recognition that mind wandering is best understood through the joint measurement of multiple, partially overlapping dimensions.

We conclude by considering the construct of unconstrained thought in relation to the broader

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concept of mind wandering. While some have argued that mind wandering should be treated as a discrete category with relatively hard boundaries, such that instances must satisfy a set of necessary defining features (Christoff et al., 2018), others have suggested that the concept is better understood from a family-resemblance perspective (Seli et al., 2018), in which thoughts vary continuously along underlying dimensions (e.g., intentionality, task relatedness), with these values determining how prototypical a given thought is. Within this latter framework, unconstrained thought can be viewed as one such continuous dimension that may help to specify the mind-wandering construct, such that less constrained thought would tend to be more prototypical of mind wandering. The present findings suggest, however, that the dimension of unconstrained thought—as operationalized here—overlaps substantially with spontaneity of thought (i.e., unintentionality). Of course, although the UTQ items loaded onto a single factor, it remains possible that unconstrained thought encompasses multiple, potentially dissociable dimensions, such as the degree of topical shifting, ease of flow, or the presence of an overarching purpose (see A. P. Smith et al., 2022). Determining which of these dimensions provide meaningful explanatory value beyond existing constructs will require future work aimed at clarifying the dimensional structure of mind wandering and spontaneous thought more generally.

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Received August 11, 2025
Revision received June 16, 2026
Accepted June 17, 2026 ■

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