AUTHOR PREPRINT

Curious and Fantastical: The Daydreaming of Creative Writers

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4916 words (excluding references and tables)

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Abstract

What are the daydreams of creative individuals like? Do they reflect the daydreamer's level of creativity? To answer this question, this research examines the daydreams of creative writers and ordinary people. Among several daydream qualities, the research focused particularly on curiosity, or the extent to which daydreams revolve around unresolved questions and problems. Studies 1 and 2 provide evidence that curious daydreams—along with fantastical daydreams—predict creativity in community samples. Study 3 compares the daydreams of professional creative writers and non-writers, and examines what daydream qualities predict creativity within these groups. On questionnaires and in a week-long experience sampling procedure, writers reported more curious and fantastical daydreams than non-writers. Fantastical daydreams predicted their lifetime history of creative behavior and achievement. Moreover, daily creative behavior and inspiration throughout the study were predicted by curious, fantastical, meaningful, and pleasant daydreaming, with notable differences between writers and non-writers.

Keywords: daydreaming; mind wandering; experience sampling; creativity

“All the time that I am making beds and doing dishes and driving to town for dancing shoes, I am telling myself stories,” the acclaimed author Shirley Jackson (1916-1965) once said when describing her creative process (Franklin, 2016). “After all, who can vacuum a room and concentrate on it?”

This phenomenon—thoughts drifting away from one’s current activity—is called daydreaming, or mind wandering (e.g., Singer, 1975; Smallwood & Schooler, 2006). Jackson’s quote suggests that her daydreams were much more interesting than her mundane domestic life, and perhaps the inspiration for her extraordinary works. This raises a question: Do the qualities of a person’s daydreams reflect their level of creativity? To answer this question, the present research examines the daydreams of creative writers and non-writers, and examines which daydream qualities are associated with creativity in both groups.

Daydreaming and Creativity

Several studies have examined the daydreams of creative individuals. A diary study with artists working on short films (Benedek, Jauk, et al, 2017) found that artists regularly reported useful ideas coming to them while they were occupied with other things—in other words, daydreaming. These instances did not directly predict the advancement of their current work, although they may have influenced later work.

Another daily diary study examined the creative process of writers and theoretical physicists (Gable, Hopper, & Schooler, 2019) and found that approximately 20% of creative ideas occurred to them while working on unrelated tasks, i.e., daydreaming. Moreover, ideas that emerged from daydreams were disproportionately likely to help them overcome an impasse.

Lab studies investigating the relationship between daydreaming and creativity have yielded mixed results. Several studies found correlations between frequent daydreaming and creativity (Baird et al., 2012; Leszczynski et al., 2017; Zedelius & Schooler, 2015). Several studies found that experimentally increased daydreaming (by varying task demands) increased subsequent creativity (Baird et al., 2012; Leszczynski et al., 2017), however, others have failed to observe this (Smeekens & Kane, 2016). What all these studies have in common is that they only examined daydreaming frequency. Perhaps a more relevant question, when it comes to the relationship with

creativity, is what people's daydreams are *like*.

This question was explored in a more recent study, in which the creative behavior of students was related to the styles and contents of their daydreams (Zedelius, Protzko, Broadway, & Schooler, 2020). The results showed that having more personally meaningful and more fantastical daydreams was associated with a stronger history of creative behavior and better creative writing. Meaningful and fantastical daydreaming also, respectively, predicted daily inspiration and creative behavior during an experience-sampling period. While these results show that certain daydream qualities predict creativity, they are by no means conclusive. Since the study was done in a student sample, we do not know whether the same daydream qualities are associated with creativity in more accomplished creative individuals. Moreover, the study may have missed important aspects of daydreaming that are indicative of creativity. The current studies address these questions. We are especially interested in one previously neglected daydreaming quality: the extent to which daydreams are driven by curiosity for unresolved problems, tasks and questions.

Curious Daydreaming

Unresolved problems, tasks and questions tend to be “sticky” in our memory (a phenomenon known as “Zeigarnik effect”, e.g., Patalano & Seifert, 1994; Zeigarnik, 1927) and frequently intrude our daydreams (Masicampo & Baumeister, 2011). While such intrusions distract us from current activities, they may help us stay engaged with unresolved problems and questions, and maybe even help us find creative inspiration.

Curiosity as a personality trait has been linked to creativity (e.g., Conner & Silvia, 2015; Hagtvedt, Dossinger, Harrison, & Huang, 2019; Hardy, Ness, & Mecca, 2017; Gross, Araujo, Zedelius, & Schooler, 2019; Karwowski, 2012; Kashdan, & Fincham, 2002). Curious individuals are interested in exploring a broad array of novel stimuli and ideas (Gross et al., 2019), and motivated to invest prolonged effort to solve a problem or work out an idea (e.g., Hardy et al., 2017). Curiosity is also a fundamental aspect of the personality trait openness to experience, a characteristic trait of creative individuals (Feist, 1988; Kaufman et al., 2016; McCrae, 1987; Silvia et al., 2009). Given the link between curiosity and creativity, might curiosity be a characteristic quality of the daydreams of creative individuals?

The Present Research

We conducted three studies examining associations between the qualities of people's daydreams and their level of creativity. Studies 1 and 2 served to establish measures of curious daydreaming: a trait-scale that assesses people's general tendency for curious daydreaming and a state-scale that applies to individual daydreaming episodes. The studies also provide first evidence that curious daydreams—along with fantastical daydreams—are unique predictors of creativity. In Study 3, we compared the daydreams of creative writers and a control group. Based on our initial studies, we expected that writers and non-writers would differ with respect to both curious and fantastical daydreaming (the latter prediction fitting with the portrayal of artists as more unconventional thinkers; e.g., Barron, 1966). We report all manipulations and dependent measures. All data have been collected in a manner consistent with ethical standards for the treatment of human subjects, and with approval from the local internal review board.

Study 1

To establish the concept of “curious daydreaming”, we constructed two scales that capture daydreams revolving around unresolved problems, tasks or questions. A state scale assesses individual daydreaming episodes, and a trait scale the general tendency to have these types of daydreams. We administered these scales along with measures of creativity, social desirability, rumination, and other daydream qualities. Our goal was to establish convergent and divergent validity of the new scales and provide a first test for our prediction that curious daydreaming is associated with creativity.

Participants

We aimed to collect data from 170-200 participants. This was based on a desired subject-to-item ratio of 10:1 (Osborne & Costello, 2004) and the goal to examine moderate size correlations (Schönbrodt, & Perugini, 2013). 205 participants (all US residents) were recruited via Amazon's Mturk. 23 participants were removed for failing at least one of two attention checks. 182 participants (89 men, 92 women, 1 unassigned, average age = 33.94, SD = 10.01) were included in the analyses.

Measures and Procedure

Participants were first asked to recall their most recent daydream. They answered open-ended questions (“When did you have this daydream?”, “What were you daydreaming about?”, “What kind of activity were you engaged in while daydreaming?”) and then responded to the following scales.

State Daydreaming Styles scale

This 18-item scale assesses the six daydreaming dimensions mentioned above (Zedelius et al., 2020). Example items are “I was thinking about things that might happen in a few days” (*planning*), “The daydreams left me with warm, happy feelings” (*pleasant daydreaming*), “The daydream was very meaningful for me” (*meaningful daydreaming*), “For a while, I was not aware of the fact that I was daydreaming” (*unaware daydreaming*), “I was thinking about sex” (*sexual thoughts*), and “I daydreamed about something supernatural” (*fantastical daydreaming*). As with all of the daydreaming scales, items were presented in random order. Participants responded on a 5-point Likert Scale from “definitely untrue” to “definitely true”.

State Curious Daydreaming Scale

This newly constructed scale consisted of 7 items (see Table 1), with the same five-point Likert scale.

Trait Daydreaming Styles Scale

This 18-item scale is a trait version of the 6-dimensional daydreaming styles scale (Zedelius et al., 2020). Example items are “I think about things that might happen in the next few days” (*planning*), “My daydreams leave me with warm, happy feelings” (*pleasant daydreaming*), “My daydreams are very meaningful for me” (*meaningful daydreaming*), “When I start to daydream, I remain unaware of it for a while” (*unaware daydreaming*), “I daydream about sex” (*sexual thoughts*), and “I daydream about supernatural things” (*fantastical daydreaming*).

Preliminary Trait Curious Daydreaming Scale

This new scale consisted of 17 items (see Table 2).

Creative Behavior Inventory Short Form

This 24-item inventory (Dollinger 2003) assesses a person’s lifetime history of creative behavior. Examples are: “Designed and made your own greeting cards”; “Had

a piece of literature (e.g. poem, short stories, etc.) published in a school or university publication”).

Creative Achievement Questionnaire (CAQ)

The CAQ (Carson, Peterson, & Higgins, 2005) assesses achievements in ten creative domains (e.g., visual arts, music, writing). For each domain, the CAQ lists 8 items that describe increasing levels of accomplishment, from “no training or recognized talent” up to very high-level achievements.

Rumination Short Form

Because the curious daydreaming scales describe a preoccupation with unfinished problems, we wanted to test if the concept overlaps with rumination, using the 8-item Rumination subscale of the Rumination and Reflection Questionnaire (Trapnell & Campbell, 1999).

Social Desirability Scale Short Form

This 10-item scale (form M-C1 in Strahan & Gerbasi, 1972) assesses socially desirable responding.

Results and Discussion

Curious Daydreaming: Factor Structure

Exploratory Factor Analysis (EFA) suggests the state curious daydreaming scale comprises a single factor, which explained 64.63% of variance. All items loaded highly on this factor (see Table 1). Cronbach’s alpha is .904.

For the trait scale, the EFA initially returned 3 factors (explaining 48.10%, 8.54% and 6.24% of variance, respectively). However, a one-factor solution provided a better fit, as all but three items loaded highly on the first factor. After dropping these items, the resulting 14-item scale returned a single factor explaining 56.35% of variance with a Cronbach’s alpha is .939 (See table 2).

Table 1. State curious daydreaming scale items and factor loadings.

Item #	Item	Factor loadings Study 1	Factor loadings Study 2
1	The daydream revolved around an unfinished task or project	.650	.785
2	I daydreamed about an intriguing question that I have yet to find an answer to	.707	.622
3	The daydream led to the solution to a problem or question that had previously stumped me	.747	.769
4	I daydreamed about an interesting question or problem I have yet to solve.	.817	.835
5	The daydream revolved around what the solution to a problem I have might look like	.850	.826
6	I thought about what the solution to a problem or question I am working on might look like without necessarily trying to solve it	.848	.791
7	The daydream led to an insight about how to proceed with a task or problem I'm working on	.747	.692

Table 2. Trait curious daydreaming items and factor loadings. Items 1-14 are the final scale.

Item #	Item	Factor loadings Study 1	Factor loadings Study 2
1	When I hit a mental roadblock while working on a task or project, I often find myself daydreaming about possible solutions	.742	.814
2	When I'm stumped on a project, daydreaming helps me get ideas for how to proceed	.791	.865
3	When I'm stumped on a solution, I try to imagine what the solution might look like so my mind can mull it over	.723	.754
4	My daydreams revolve around unsolved problems or unanswered questions	.698	.736
5	My daydreams revolve around unfinished tasks or projects	.660	.764
6	My daydreams lead to insights about how to proceed with a task or problem I'm working on	.818	.853
7	When I'm stumped on a problem, I imagine what the solution might look like without necessarily trying to solve it	.649	.755
8	When I am unable to solve a problem, I imagine what the characteristics of a solution might entail so that I recognize a solution when I come upon it	.731	.775
9	When I encounter an interesting question or problem that I have yet to solve, I set it aside to let my mind wander about it	.677	.699
10	My mind naturally wanders to intriguing questions or issues that I have yet to solve	.584	.745
11	When I daydream I gain new perspectives on problems or questions that have stumped me	.808	.837
12	When I daydream I gain new perspectives on unfinished tasks or projects	.752	.850
13	When I daydream I make progress on problems or questions that I have been working on	.780	.833
14	When I daydream I make progress on tasks or projects that I have been working on	.749	.832
15	When I hit a mental roadblock while working on a problem, I try to keep at it until I find the solution (Reverse scored)		
16	When I'm stumped on a project, I try not to daydream until the work is done (Reverse scored)		
17	When I am stumped on a question or problem I find it is helpful to sleep on it		

Curious Daydreaming: Convergent and Divergent Validity

State curious daydreaming correlated moderately with the state daydreaming styles meaning and planning, and negatively with pleasant daydreaming (see Table 3). This fits with our conceptualization of curious daydreaming as revolving around interesting problems one wants to continue pursuing.

For trait curious daydreaming, we found correlations with planning and meaningful daydreaming, as well as fantastical and unaware daydreaming, (see Table 4.) These results establish curious daydreaming as a unique type of daydreaming that overlaps with other daydreaming styles but is not redundant. Despite the scale's focus on unresolved problems, it does not correlate with rumination, nor social desirability.

Table 3. Descriptive statistics (mean and standard deviation), reliability and inter-correlations between state daydreaming sub-scales in Study 1.

Variable	M (SD)	Cronbach's alpha	Planning -state	Pleasant- state	Meaning -state	Unaware -state	Sex-state	Fantastic al-state
Curious- state	2.20 (1.08)	.90	$r = .287$ $p < .001$	$r = -.234$ $p = .001$	$r = .187$ $p = .011$	$r = .142$ $p = .056$	$r = -.145$ $p = .051$	$r = .063$ $p = .401$
Planning -state	2.68 (1.08)	.59		$r = .020$ $p = .787$	$r = .234$ $p = .002$	$r = .112$ $p = .134$	$r = .070$ $p = .351$	$r = -.093$ $p = .214$
Pleasant- state	4.14 (1.03)	.85			$r = .199$ $p = .007$	$r = .003$ $p = .966$	$r = .051$ $p = .494$	$r = .019$ $p = .804$
Meaning -state	3.95 (0.89)	.79				$r = .013$ $p = .859$	$r = -.079$ $p = .287$	$r = -.271$ $p < .001$
Unaware -state	2.92 (1.10)	.81					$r = -.119$ $p = .111$	$r = .026$ $p = .727$
Sex-state	1.52 (1.03)	.89						$r = .184$ $p = .013$
Fantastic al-state	1.55 (0.84)	.70						

Table 4. Descriptive statistics (mean and standard deviation), reliability and inter-correlations between trait scales in Study 1.

Variable	M (SD)	Cr. alpha	Planning -trait	Pleasant -trait	Meaning -trait	Unaware -trait	Sex - trait	Fantastic al-trait	CBI	CAQ	Soc. des.	Rum.
Curious- trait	3.45 (0.81)	.94	$r = .356$ $p < .001$	$r = .054$ $p = .470$	$r = .300$ $p < .001$	$r = .190$ $p = .010$	$r = .113$ $p = .131$	$r = .204$ $p = .006$	$r = .242$ $p = .001$	$r = .266$ $p < .001$	$r = -.018$ $p = .813$	$r = .106$ $p = .155$
Planning- trait	3.66 (0.80)	.65		$r = .084$ $p = .261$	$r = .232$ $p = .002$	$r = .214$ $p = .004$	$r = .131$ $p = .079$	$r = -.041$ $p = .580$	$r = .114$ $p = .127$	$r = .012$ $p = .870$	$r = .099$ $p = .185$	$r = .022$ $p = .765$
Pleasant- trait	3.98 (0.74)	.76			$r = .213$ $p = .004$	$r = .115$ $p = .122$	$r = .159$ $p = .033$	$r = -.038$ $p = .609$	$r = -.029$ $p = .701$	$r = -.058$ $p = .435$	$r = -.119$ $p = .110$	$r = -.258$ $p < .001$
Meaning- trait	3.72 (0.74)	.64				$r = .028$ $p = .704$	$r = .118$ $p = .113$	$r = -.014$ $p = .851$	$r = .063$ $p = .397$	$r = .082$ $p = .271$	$r = -.040$ $p = .856$	$r = -.007$ $p = .926$
Unaware- trait	3.15 (1.05)	.86					$r = -.015$ $p = .838$	$r = .149$ $p = .045$	$r = .095$ $p = .200$	$r = -.016$ $p = .827$	$r = .014$ $p = .856$	$r = .119$ $p = .108$
Sex-trait	3.10 (1.34)	.93						$r = .251$ $p = .001$	$r = .091$ $p = .221$	$r = .129$ $p = .083$	$r = -.118$ $p = .113$	$r = .097$ $p = .195$
Fantastical- trait	2.31 (1.05)	.72							$r = .243$ $p = .001$	$r = .147$ $p = .047$	$r = -.119$ $p = .109$	$r = .171$ $p = .021$
CBI	1.77 (0.54)	.91								$r = .478$ $p < .001$	$r = .051$ $p = .499$	$r = .048$ $p = .522$
CAQ	15.61 (15.21)	.54									$r = -.012$ $p = .873$	$r = .073$ $p = .327$
Soc. des.	4.55 (2.60)	.75										$r = -.381$ $p < .001$
Rum.	3.21 (0.94)	.90										

CBI = Creative Behavior Inventory, CAQ = Creative Achievement Questionnaire, Soc. des. = social desirability scale, Rum. = rumination short form

Curious Daydreaming and Creativity

Next, we tested if curious daydreaming is associated with creativity. We limited these analyses to trait daydreaming, since a single daydreaming episode in the moment seems unlikely to predict a lifetime history of creativity. We found significant correlations between trait curious daydreaming and CBI and CAQ scores (see Table 4). To test whether curious daydreaming predicts creativity over and above the other daydreaming styles, we ran a regression analysis on CBI scores with curious daydreaming and the other six daydreaming styles as predictors (see Table 5). Curious daydreaming emerged as a significant predictor. The only other significant predictor was fantastical daydreaming.

To answer the same question for creative achievement, we calculated a negative binomial regression model to deal with the over-dispersed scores that are typical for the CAQ (see Silvia & Kimbrel, 2010). Curious daydreaming emerged as the sole predictor (see Table 6).

In sum, the newly developed measures of curious daydreaming are reliable and capture a unique type of daydreaming. Although curious daydreaming is not pleasant, it is distinct from rumination. Most importantly, curious daydreaming—along with fantastical daydreaming—predicted creative behavior and achievement.

Table 5. Regression results for trait daydreaming styles on Creative Behavior Inventory scores in Study 1.

Variable	B	SE	<i>t</i>	<i>p</i>	95% CI
Curious-trait	.117	.055	2.141	.034	(.009, .225)
Planning-trait	.036	.054	.662	.509	(-.071, .142)
Pleasant-trait	-.031	.055	-.571	.569	(-.139, .077)
Meaning-trait	.005	.057	.087	.931	(-.107, .117)
Unaware-trait	.013	.039	.345	.731	(-.063, .090)
Sex-trait	.009	.031	.227	.782	(-.052, .070)
Fantastical-trait	.102	.040	2.548	.012	(.023, .181)
Constant	1.037	.316	3.281	.001	(.413, 1.661)

Table 6. Negative binomial regression results for trait daydreaming styles on Creative Achievement Questionnaire-overall score in Study 1.

Variable	Estimate	SE	<i>z</i>	<i>p</i>	95% CI
Curious-trait	.322	.083	3.89	.000	(.160, .484)
Planning-trait	-.078	.093	-.85	.40	(-.260, .103)
Pleasant-trait	-.152	.085	-1.79	.074	(-.320, .015)
Meaning-trait	.024	.091	.27	.788	(-.154, .202)
Unaware-trait	-.071	.057	-1.07	.286	(-.202, .059)
Sex-trait	.065	.051	1.26	.209	(-.036, .165)
Fantastical-trait	.088	.066	1.35	.177	(-.040, .217)
Constant	2.207	.498	4.43	.000	(.1.231, 3.182)
Dispersion parameter (alpha) = 0.631					
Likelihood-ratio test of alpha = 0: $\chi^2 = 1259.43$, $p < .001$					

Study 2

The goal of Study 2 was to replicate and extend Study 1 by including additional measures of curiosity and emotions to verify that curious daydreaming captures a state akin to curiosity.

Participants

As in Study 1, our a-priori goal was to collect data from 170-200 participants. We recruited 200 US residents via Mturk. 12 were removed for failing at least one of two attention checks. This left 188 participants (94 men, 90 women, 4 other, average age = 35.10, SD = 10.65) for analyses.

Measures and Procedure

The measures and procedure were identical to Study 1, with the following additions.

Emotions

After reporting on their most recent daydream, participants reported which emotions they had felt, using the Positive And Negative Affect Schedule (PANAS;

Watson, Clark, & Tellegen, 1988). In addition to the 20 standard PANAS items, we included the emotions “curious” and “frustrated”, which are theoretically associated with curiosity (Litman, 2005; 2010).

Additional Daydreaming Items

After the state and trait curious daydreaming scales (respectively), we administered additional state and trait items capturing a different kind of curious daydreaming more focused on novelty and exploration. Since this measure was not used in the next study, we won’t report the results here.

Epistemic Curiosity Scale

This 10-item scale (Litman & Spielberger, 2003) was used to assess individual differences in curiosity. The scale comprises the sub-scales *Deprivation* and *Interest curiosity*, which refer, respectively, to the desire to solve specific problems and the desire for exploring novel information more generally.

Results and Discussion

Curious Daydreaming: Convergent and Divergent Validity

For state curious daydreaming, we found the same correlations with other daydreaming styles as before (see Table 7). Moreover, curious daydreaming was associated with both positive and negative emotions (see Table 8). It did not correlate with feeling directly “curious”, but did with feeling “frustrated”. Despite the non-significant correlation with the curious item, this is in line with the literature, which describes curiosity as an emotionally ambiguous state with both pleasant and unpleasant emotions, and particularly frustration (Litman & Jimerson, 2004).

For trait daydreaming, we again found correlations with planning, meaningful and fantastical daydreaming. For descriptive statistics and correlations with other daydreaming types, see Table 9. We again found no correlations with social desirability or rumination, but we did find a correlation with epistemic curiosity (see Table 10). Thus, curious daydreaming is associated with a desire to ponder specific problems and more general interest curiosity.

Table 7. Descriptive statistics (mean and standard deviation) and inter-correlations between state daydreaming scales in Study 2.

Variable	M (SD)	Cronbach's alpha	Planning -state	Pleasant -state	Meaning- state	Unaware- state	Sex- state	Fantastical -state
Curious- state	2.43 (1.13)	.91	$r = .423$ $p < .001$	$r = -.124$ $p = .089$	$r = .229$ $p = .002$	$r = -.006$ $p = .933$	$r = .063$ $p = .390$	$r = .272$ $p < .001$
Planning- state	2.83 (1.12)	.70		$r = -.191$ $p = .009$	$r = -.018$ $p = .803$	$r = .262$ $p < .001$	$r = .025$ $p = .736$	$r = .049$ $p = .505$
Pleasant- state	4.20 (0.94)	.84			$r = .250$ $p = .001$	$r = .026$ $p = .720$	$r = -.018$ $p = .809$	$r = -.001$ $p = .985$
Meaning- state	4.01 (0.89)	.81				$r = .079$ $p = .282$	$r = -.203$ $p = .005$	$r = -.170$ $p = .020$
Unaware- state	3.06 (1.09)	.76					$r = -.008$ $p = .917$	$r = -.075$ $p = .308$
Sex-state	1.83 (1.22)	.91						$r = .316$ $p < .001$
Fantastical -state	1.86 (1.05)	.78						

Table 8. Correlations between state daydreaming and positive and negative emotions on the Positive And Negative Effect Schedule (PANAS) as well as feelings of curiosity and frustration in Study 2.

Variable	PANAS-positive	PANAS-negative	Curious emotion	Frustrated emotion
Curious-state	$r = .202$ $p = .006$	$r = .229$ $p = .002$	$r = .095$ $p = .195$	$r = .256$ $p < .001$
Planning-state	$r = .072$ $p = .324$	$r = .140$ $p = .056$	$r = .057$ $p = .439$	$r = .068$ $p = .355$
Pleasant-state	$r = .310$ $p < .001$	$r = -.304$ $p < .001$	$r = .253$ $p < .001$	$r = -.280$ $p < .001$
Meaning-state	$r = .224$ $p = .002$	$r = -.103$ $p = .159$	$r = .018$ $p = .803$	$r = .022$ $p = .764$
Unaware-state	$r = .007$ $p = .926$	$r = .088$ $p = .228$	$r = -.010$ $p = .891$	$r = -.027$ $p = .713$
Sex-state	$r = .054$ $p = .460$	$r = .266$ $p < .001$	$r = .140$ $p = .055$	$r = .270$ $p < .001$
Fantastical-state	$r = .248$ $p = .001$	$r = .237$ $p = .001$	$r = .172$ $p = .018$	$r = .215$ $p = .003$

Table 9. Descriptive statistics (mean and standard deviation), reliability and inter-correlations between trait daydreaming scales in Study 2.

Variable	M (SD)	Cronbach's alpha	Plannin g-trait	Pleasant -trait	Meaning -trait	Unaware -trait	Sex - trait	Fantastic al-trait
Curious- trait	3.43 (0.96)	.96	$r = .503$ $p < .001$	$r = -.013$ $p = .861$	$r = .248$ $p = .001$	$r = .099$ $p = .177$	$r = .066$ $p = .369$	$r = .219$ $p = .003$
Planning- trait	3.73 (0.76)	.58		$r = -.009$ $p = .897$	$r = .248$ $p = .001$	$r = .231$ $p = .001$	$r = .029$ $p = .695$	$r = -.003$ $p = .966$
Pleasant- trait	3.99 (0.70)	.60			$r = .344$ $p < .001$	$r = .051$ $p = .489$	$r = -.088$ $p = .228$	$r = .079$ $p = .278$
Meaning- trait	3.82 (0.75)	.56				$r = .099$ $p = .176$	$r = -.022$ $p = .760$	$r = .027$ $p = .713$
Unaware- trait	3.15 (1.05)	.79					$r = .098$ $p = .179$	$r = -.002$ $p = .982$
Sex-trait	2.99 (1.33)	.91						$r = .297$ $p < .001$
Fantastical- trait	2.42 (1.07)	.73						

Curious Daydreaming and Creativity

Trait curious daydreaming once again correlated with creative behavior, and for creative achievement, the correlation was trending (see Table 10). We again ran a regression analysis on CBI scores with curious daydreaming and the other six daydreaming styles as predictors (see Table 11). Replicating the findings in Study 1, curious daydreaming emerged as a significant predictor of creative behavior, along with fantastical daydreaming. For creative achievement, we again calculated a negative binomial regression (see Table 12). This time, fantastical daydreaming emerged as the only predictor.

Table 10. Correlations between trait daydreaming and trait dependent measures in Study 2.

Variable	CBI	CAQ	Social desirability	Rumination	Epistemic curiosity
Curious-trait	$r = .294$ $p < .001$	$r = .121$ $p = .098$	$r = .002$ $p = .975$	$r = .100$ $p = .171$	$r = .314$ $p < .001$
Planning-trait	$r = .213$ $p = .003$	$r = .112$ $p = .124$	$r = -.104$ $p = .157$	$r = .074$ $p = .316$	$r = .165$ $p = .024$
Pleasant-trait	$r = .008$ $p = .912$	$r = -.049$ $p = .507$	$r = .092$ $p = .208$	$r = -.260$ $p < .001$	$r = .081$ $p = .271$
Meaning-trait	$r = .073$ $p = .317$	$r = .032$ $p = .665$	$r = .029$ $p = .692$	$r = .119$ $p = .102$	$r = .252$ $p < .001$
Unaware-trait	$r = .165$ $p = .024$	$r = .068$ $p = .355$	$r = -.141$ $p = .053$	$r = .125$ $p = .088$	$r = .161$ $p = .027$
Sex-trait	$r = .059$ $p = .423$	$r = .131$ $p = .073$	$r = -.153$ $p = .036$	$r = .174$ $p = .017$	$r = .139$ $p = .058$
Fantastical-trait	$r = .306$ $p < .001$	$r = .161$ $p = .028$	$r = .004$ $p = .956$	$r = .146$ $p = .045$	$r = .166$ $p = .023$

CBI = Creative Behavior Inventory, CAQ = Creative Achievement Questionnaire.

Note: While our conceptualization of curious daydreaming resembles deprivation curiosity (i.e., the urge to find the answer to a specific problem), curious daydreaming correlates similarly with both subscales of the Epistemic curiosity scale (Deprivation curiosity: $r = .272$, $p < .001$; Interest curiosity: $r = .274$, $p < .001$).

Table 11. Regression results for daydreaming styles on Creative Behavior Inventory scores in Study 2.

Variable	B	SE	<i>t</i>	<i>p</i>	95% CI
Curious-trait	.100	.047	2.122	.035	(.007, .194)
Planning-trait	.073	.060	1.214	.226	(-.045, .191)
Pleasant-trait	-.016	.059	-.270	.788	(-.132, .100)
Meaning-trait	-.007	.057	-.129	.897	(-.119, .104)
Unaware-trait	.070	.037	1.892	.060	(-.119, .104)
Sex-trait	-.023	.030	-.776	.439	(-.083, .036)
Fantastical-trait	.148	.038	3.890	.000	(.073, .224)
Constant	.791	.322	2.46	.015	(.156, .143)

Table 12. Negative binomial regression results for daydreaming styles on Creative Achievement Questionnaire-overall score in Study 2

Variable	Coefficient	SE	<i>z</i>	<i>p</i>	95% CI
Curious-trait	.061	.096	.64	.521	(-.126, .249)
Planning-trait	.080	.117	.69	.491	(-.148, .309)
Pleasant-trait	-.081	.118	-.69	.491	(-.312, .150)
Meaning-trait	.046	.124	.37	.713	(-.197, .289)
Unaware-trait	.072	.080	.90	.367	(-.085, .229)
Sex-trait	.087	.065	1.34	.181	(-.040, .215)
Fantastical-trait	.162	.080	2.03	.043	(.005, .318)
Constant	1.65	.698	2.37	.018	(.286, 3.022)
Dispersion parameter (alpha) = 0.999					
Likelihood-ratio test of alpha = 0: $\chi^2 = 2907.54$, $p < .001$					

In sum, the results are consistent with Study 1 and support the validity of the new curious daydreaming scales as measures for a unique, creative type of daydreaming.

Study 3

In Study 3, we examined the qualities of daydreaming among highly creative individuals by comparing professional creative writers to college-educated professionals matched on key characteristics (i.e., work hours and non-manual nature of their work). We predicted that the writers would score higher on curious and fantastical daydreaming. We first assessed trait daydreaming and creative behavior and achievements in all participants. Next, we conducted a week-long experience sampling procedure, in which participants were probed several times per day on their daydreaming. Every evening, they reported their creative behavior and feelings of inspiration for that day. This allowed us to not only compare the two groups to each other, but also to test which types of daydreams predict creativity within groups.

Participants

Professional creative writers and a control group of adults matched were recruited through advertisements in online forums and newspapers, including a publication by the Writers Guild of America West. Interested people filled out a pre-screening survey to determine whether they were eligible (see online materials.) Our goal was to recruit as many participants as we could, and at least 100 per group.

We collected data from 365 participants; 182 writers ($M_{\text{age}} = 34.10$, $SD = 10.58$, 57.7% female) and 183 non-writers ($M_{\text{age}} = 33.65$, $SD = 9.67$, 75.7% female). Demographics are listed in Table 13.

While all 365 participants responded to the trait daydreaming questions, 31 skipped either the CBI or the CBQ due to a technical error. This leaves 334 participants (165 writers; $M_{\text{age}} = 34.30$, $SD = 10.71$, 57.6% female, and 169 non-writers; $M_{\text{age}} = 33.43$, $SD = 9.63$, 76.7% female) for analyses of the trait data.

Of the initial 365 participants, 75 provided no daydreaming and end-of-day reports on the same days during experience sampling. This left us with data from 290 participants for analyses of the experience sampling data (146 writers, $M_{\text{age}} = 35.87$, $SD = 11.51$, 61.0% female, and 144 non-writers; $M_{\text{age}} = 34.48$, $SD = 9.98$, 73.9% female).

Table 13. Demographics for writers and non-writers.

Highest level of education	Writers	Non-writers
High school/GED	2.2%	0
Some college	11%	4.4%
2-year college degree	7.7%	7.7%
4-year college degree	58.2%	63.9%
Masters degree	18.1%	19.1%
Doctoral degree	2.2%	2.2%
Professional degree (JD/MD)	0.5%	2.7%
Race or ethnicity	Writers	Non-writers
Caucasian/white	58.2%	55.7%
African American	9.3%	9.3%
Latino or Hispanic	5.5%	12.0%
South Asian	4.9%	4.9%
East Asian	0.5%	5.5%
Middle Eastern	3.3%	0.5%
Caribbean	0	2.7%
Mixed	12.6%	6.0%
Other	5.5%	2.7%

Measures and Procedures

Participants were invited to install an application (MetricWire) to collect data on their smartphone. They were then asked to complete a 28-version of the CBI, the CAQ, the Trait Daydreaming Styles Scale and the Trait Curious Daydreaming Scale, as in Studies 1 and 2. The next day, and over the following 6 days, they participated in the following experience sampling procedure.

Participants received 11 notifications with a ring-tone on their phone at random moments between 9am and 9pm. If they did not respond to a notification, or “thought probe”, a second follow-up probe was sent 10 minutes later. If they ignored this probe, it disappeared after 10 minutes.

Participants were first asked, “What were you doing before you received this notification?” and then, “Were you daydreaming in the moment before you received this notification?” They were reminded of the definition of daydreaming (“Daydreaming is when you stop attending to your current task or environment and start thinking about other things”) and could respond with yes or no. If they responded yes, we asked them to “think about the daydream you just had”. If they responded no, we asked them to, “think about your most recent daydream”. This was to assure participants would not be inclined answer “no” to quickly finish the questions. We only analyzed episodes when participants answered yes. Participants then rated the qualities of their daydream using the State Daydreaming Styles scale and items 1-3 from the state curious daydreaming scale. We only used the first three items to have the same number of items for each type of daydream. All items were presented together in random order.

At the end of each day (9:45pm), participants received another prompt with two questions. The first question (taken from Conner & Silvia, 2015) was, “How creative were you today? (Being creative includes coming up with novel or original ideas; expressing oneself in an original way, or spending time doing artistic activities (art, music, painting, writing, etc.))”. The second question was, “How inspired did you feel today?” Participants answered on a 5-point scale from “not at all creative [inspired]” to “very creative [inspired]”. These were our dependent variables for the experience-sampling component.

Finally, we asked three questions about their most creative idea that day and administered a mood questionnaire (see online materials). The results for these questions will be reported elsewhere. Those were the final questions for the day.

Results and Discussion

Trait Daydreaming and lifetime Creativity

Group Differences in Creativity

First, we examined if the writers and non-writers differed as expected from each other in their lifetime history of creative behavior and achievement. A regression on CBI scores showed that writers scored significantly higher ($M = 2.19$, $SD = .52$) than non-writers ($M = 1.82$, $SD = .53$), $F(1, 332) = 41.84$, $p < .001$, $\eta^2 = .11$. On the CAQ,

writers likewise scored higher ($M = 32.69$, $SD = 25.37$) than non-writers (15.80 , $SD = 18.29$), $b = .727$, $z = 7.85$, $p < .001$.

Group Differences in Daydreaming

Next, we compared the groups in their daydreaming tendencies. Table 14 reports descriptive statistics and regression analyses testing whether writers differ from non-writers in trait daydreaming. Writers reported significantly more curious and fantastical daydreaming.

Table 14. Descriptive statistics (mean and standard deviation) for trait daydreaming styles among non-writers and writers, and regression results testing group differences.

Variable	Cronbach's alpha	Non-writers	Writers	<i>b</i>	<i>t</i>	<i>p</i>	95%IC
Curious-trait	.884	$M = 3.84$ $SD = .99$	$M = 4.04$ $SD = .82$	.200	2.01	.046	(.004, .397)
Planning-trait	.880	$M = 4.24$ $SD = .69$	$M = 4.24$ $SD = .69$	.001	.01	.993	(-.148, .149)
Pleasant-trait	.715	$M = 3.48$ $SD = .87$	$M = 3.35$ $SD = .83$	-.124	-1.33	.185	(-.307, .060)
Meaning-trait	.793	$M = 3.96$ $SD = .71$	$M = 4.01$ $SD = .75$	.050	.62	.537	(-.108, .208)
Unaware-trait	.939	$M = 3.53$ $SD = .93$	$M = 3.61$ $SD = .96$	.074	.71	.480	(-.131, .278)
Sex-trait	.951	$M = 3.54$ $SD = 1.27$	$M = 3.73$ $SD = 1.09$	.187	1.44	.150	(-.068, .442)
Fantastical-trait	.906	$M = 2.81$ $SD = 1.06$	$M = 3.29$ $SD = 1.03$	.484	4.23	.000	(.259, .709)

Creative Behavior

Collapsing over writers and non-writers, a regression predicting CBI scores from all trait daydreaming styles revealed that curious, fantastical and unaware daydreaming predicted creative behavior (see Table 15). We repeated the same analyses for each group. Among non-writers (see Table 16), we found only a negative effect of sexual thoughts, indicating that those reporting more sexual thoughts reported

less creative behavior. Among writers (see Table 17), more fantastical daydreaming predicted more creative behavior. Thus, the effect of curious daydreaming in the collapsed analysis seems to have been due to writers scoring higher in both creative behavior and curious daydreaming. Fantastical daydreaming was still predictive of creative behavior among writers.

Table 15. Regression results for trait daydreaming styles on Creative Behavior Inventory scores collapsed over writers and non-writers.

Variable	B	SE	<i>t</i>	<i>p</i>	95% CI
Curious-trait	.069	.034	2.02	.044	(.002, .136)
Planning-trait	.032	.045	.70	.484	(-.057, .121)
Pleasant-trait	-.043	.035	-1.23	.221	(-.111, .026)
Meaning-trait	.039	.041	.94	.347	(-.042, .120)
Unaware-trait	.070	.032	2.19	.029	(.007, .133)
Sex-trait	-.047	.025	-1.87	.062	(-.097, .002)
Fantastical-trait	.128	.028	4.55	.000	(.072, .183)
Constant	1.118	.290	3.86	.000	(.548, 1.688)

Table 16. Regression results for trait daydreaming styles on Creative Behavior Inventory scores among non-writers.

Variable	B	SE	<i>t</i>	<i>p</i>	95% CI
Curious-trait	.049	.043	1.13	.261	(-.037, .134)
Planning-trait	.063	.065	.96	.337	(-.066, .191)
Pleasant-trait	-.009	.048	-.19	.848	(-.106, .087)
Meaning-trait	.040	.061	.65	.516	(-.081, .161)
Unaware-trait	.050	.046	1.08	.281	(-.041, .142)
Sex-trait	-.084	.034	-2.45	.015	(-.153, -.016)
Fantastical-trait	.037	.040	.93	.354	(-.042, .117)
Constant	1.257	.387	3.25	.001	(.494, 2.021)

Table 17. Regression results for trait daydreaming styles on Creative Behavior Inventory scores among writers.

Variable	B	SE	<i>t</i>	<i>p</i>	95% CI
Curious-trait	.075	.052	1.45	.150	(.027, .177)
Planning-trait	.040	.059	.68	.494	(-.076, .156)
Pleasant-trait	-.051	.047	-1.08	.282	(-.144, .042)
Meaning-trait	.010	.052	.19	.848	(-.093, .113)
Unaware-trait	.054	.041	1.32	.190	(-.027, .135)
Sex-trait	-.002	.035	-.07	.944	(-.072, .067)
Fantastical-trait	.171	.038	4.54	.000	(.096, .245)
Constant	1.098	.402	2.73	.007	(.303, 1.893)

Creative Achievement

A negative binomial regression on CAQ scores, collapsed over writers and non-writers (see Table 18), showed that curious, fantastical and unaware daydreaming were associated with higher creative achievement. Among non-writers (see Table 19), more curious daydreaming predicted higher creative achievement. Moreover, a negative effect of planning suggests a greater tendency for daydreams revolving around plans is associated with less creative achievement. Among writers (Table 20) unaware and fantastical daydreaming predicted creative achievement, and curious daydreaming was just shy of traditional levels of significance on a two-tailed test ($p < .053$). Thus, curious daydreaming seems to consistently predict creative achievement in both groups.

Table 18. Negative binomial regression results for trait daydreaming styles on Creative Achievement Questionnaire-overall score, collapsed over non-writers and writers.

Variable	Coefficient	SE	<i>z</i>	<i>p</i>	95% CI
Curious-trait	.171	.056	3.04	.002	(.061, .281)
Planning-trait	-.101	.074	-1.35	.177	(-.249, .046)
Pleasant-trait	-.047	.055	-.87	.422	(-.181, .076)
Meaning-trait	-.052	.065	-.80	.422	(-.181, .076)
Unaware-trait	.123	.050	2.46	.014	(.025, .221)
Sex-trait	.016	.042	.39	.696	(-.066, .098)
Fantastical-trait	.193	.046	4.22	.000	(.103, .283)
Constant	2.173	.482	4.51	.000	(1.228, .3.117)
Dispersion parameter (alpha) = 0.692					
Likelihood-ratio test of alpha = 0: $\chi^2=4287.80, p < .001$					

Table 19. Negative binomial regression results for trait daydreaming styles on Creative Achievement Questionnaire-overall score among non-writers.

Variable	Coefficient	SE	<i>z</i>	<i>p</i>	95% CI
Curious-trait	.155	.075	2.07	.038	(.008, .302)
Planning-trait	-.283	.112	-2.57	.010	(-.508, -.068)
Pleasant-trait	-.003	.080	-.03	.977	(-.160, .155)
Meaning-trait	.018	.105	.17	.865	(-.187, .223)
Unaware-trait	.086	.077	1.12	.263	(-.064, .237)
Sex-trait	-.026	.063	-.42	.676	(-.150, .097)
Fantastical-trait	.073	.075	.98	.328	(-.073, .220)
Constant	2.866	.700	4.09	.000	(1.498, .4.253)
Dispersion parameter (alpha) = 0.728					
Likelihood-ratio test of alpha = 0: $\chi^2=1662.00, p < .001$					

Table 20. Negative binomial regression results for trait daydreaming styles on Creative Achievement Questionnaire-overall score, among writers.

Variable	Coefficient	SE	<i>z</i>	<i>p</i>	95% CI
Curious-trait	.147	.076	1.93	.053	(-.002, .297)
Planning-trait	.063	.089	.71	.481	(-.112, .239)
Pleasant-trait	-.065	.069	-.95	.343	(-.199, .069)
Meaning-trait	-.106	.076	-1.40	.162	(-.254, .042)
Unaware-trait	.122	.060	2.04	.042	(.005, .241)
Sex-trait	.048	.051	.94	.347	(-.053, .149)
Fantastical-trait	.190	.054	3.50	.000	(.083, .296)
Constant	1.966	.594	3.31	.001	(.801 .3.131)
Dispersion parameter (alpha) = 0.472					
Likelihood-ratio test of alpha = 0: $\chi^2=1792.79, p < .001$					

Experience Sampling

Group Differences in Creativity

For the experience-sampling component, our dependent variables were creative behavior and inspiration reported at the end of each day. As expected, a hierarchical linear regression on end-of-day reports of creative behavior showed that the writers reported more creative behavior ($M = 2.97$, $SD_{\text{between}} = .91$, $SD_{\text{within}} = .92$) than the non-writers, ($M = 2.46$, $SD_{\text{between}} = .84$, $SD_{\text{within}} = .94$), $b = .511$, $z = 5.25$, $p < .001$, 95%CI (.320, .701). The writers reported only marginally more inspiration ($M = 3.03$, $SD_{\text{between}} = .90$, $SD_{\text{within}} = .84$) than the non-writers ($M = 2.80$, $SD_{\text{between}} = .89$, $SD_{\text{within}} = .90$), $b = .186$, $z = 1.86$, $p = .063$, 95%CI (-.010, .381).

Group Differences in Daydreaming

Upon being probed, participants reported they were daydreaming less than half the time, with writers reporting significantly more daydreaming (46.02%) than non-writers (36.73%), according to a mixed-effects logistic regression on daydreaming reports (no vs. yes) with the fixed factor group (writer vs. non-writer) and subjects as random effect, coefficient = .455, $z = 3.63$, $p < .001$, 95%IC (.210, .701). Table 21 shows descriptive statistics of the types of daydreams reported during experience sampling, and hierarchical linear regression analyses testing differences between the groups. Creative writers reported significantly more curious, fantastical and sexual daydreams. Thus, even when accounting for their greater frequency of daydreams overall, a greater portion of their daydreams had a curious, fantastical and sexual quality.

Table 21. Descriptive statistics (mean and standard deviations) of daydreaming styles reported during experience sampling, and regression results for group differences in daydreaming. Due to the nested structure of the data (observations within participants), we report standard deviations between- and within participants.

	Non-writers	Writers	<i>Coefficient</i>	<i>z</i>	<i>p</i>	95%IC
Curious	M = 2.60 SD _{between} = .80 SD _{within} = .93	M = 2.91 SD _{between} = .70 SD _{within} = .94	.278	3.45	.000	(.120, .436)
Planning	M = 3.32 SD _{between} = .74 SD _{within} = 1.05	M = 3.43 SD _{between} = .71 SD _{within} = .98	.056	.73	.472	(-.094, .206)
Pleasant	M = 3.45 SD _{between} = .77 SD _{within} = 1.04	M = 3.44 SD _{between} = .66 SD _{within} = 1.02	.001	.01	.994	(-.145, .146)
Meaning	M = 3.63 SD _{between} = .68 SD _{within} = .87	M = 3.60 SD _{between} = .61 SD _{within} = .81	-.053	-.76	.445	(-.188, .082)
Unaware	M = 3.28 SD _{between} = .90 SD _{within} = .82	M = 3.34 SD _{between} = .80 SD _{within} = .84	.142	1.51	.130	(-.042, .326)
Sex	M = 1.74 SD _{between} = .81 SD _{within} = .99	M = 2.00 SD _{between} = .90 SD _{within} = 1.09	.242	2.63	.009	(.052, .423)
Fantastical	M = 1.69 SD _{between} = .67 SD _{within} = .70	M = 2.14 SD _{between} = .85 SD _{within} = .82	.377	4.47	.000	(.212, .543)

Note: Data represent only episodes when participants reported they were daydreaming at the moment prior to being probed.

Daily Creative Behavior and Inspiration

Next, we examined the relationships between daydreaming qualities and daily creative behavior and inspiration. Since the experience sampling data have a nested structure with multiple observations per participant, we used a hierarchical linear modeling approach in which we disaggregated two types of information: (1) individual differences *between* subjects in their daydreaming averaged over the course of the week (e.g., a writer reporting more curious daydreaming *compared to the other writers*) and (2) effects of daily fluctuations within an individual (e.g., a writer engaging in more curious daydreaming on one day *compared to the other days*). We did this by including each participant's person mean (over the entire experience sampling period) as well as individual daydreaming reports as predictors in the model (see Curran & Bauer, 2011; Hoffman & Stawski, 2009).

We conducted two multilevel mixed-effects linear regression analyses for each group; one predicting daily creative behavior and one inspiration. In each model, we included person means of daydreaming reports over the week (i.e., the between-subjects variable) and person-mean-centered observations of fluctuating daydreaming reports (i.e., the within-subjects variable) as covariates. We also included a probe counter, which counted up throughout the week, to account for the effect of time. Both models were estimated with restricted maximum likelihood estimation and autoregressive errors.

The results for the non-writers are shown in Table 22 (daily creative behavior) and Table 23 (inspiration). In this group, we found that between-subjects variations in curious daydreaming and planning predicted creative behavior. Individuals whose daydreams were often preoccupied with planning tended to be *less* creative, whereas individuals whose daydreams were more curious were more creative. At the within-subjects level, only fluctuations in fantastical daydreaming predicted creative behavior, meaning participants were more creative on days when they had more fantastical daydreams. There was also an effect of time, indicating that creative behavior decreased over the week. For reports of inspiration, the results were similar. Between-subjects variation in curious daydreaming and planning predicted inspiration. Again more planning was associated with *less* inspiration, whereas more curious daydreams

were associated with more inspiration. Analysis of between-subjects variation revealed that those who reported more meaningful daydreams throughout the week reported greater inspiration. And as with creativity, inspiration among non-writers declined over the course of the study.

Table 22. Within- and between subject predictors of end-of-day creative behavior among non-writers.

Variable	<i>b</i>	<i>z</i>	<i>p</i>	95% CI
Level 1 predictors				
Time (probe counter)	-.013	-2.41	.016	(-.024, -.002)
WS-curious	.032	1.46	.144	(-.011, .075)
WS-planning	.030	1.43	.151	(-.091, .071)
WS-pleasant	.028	1.48	.140	(-.009, .065)
WS-meaning	-.020	-.92	.360	(-.063, .023)
WS-unaware	.005	.22	.829	(-.039, .049)
WS-sex	-.008	-.42	.676	(-.044, .028)
WS-fantastical	.052	2.00	.045	(.001, .102)
Level 2 predictors				
BS-curious	.461	3.00	.003	(.160, .762)
BS-planning	-.372	-2.31	.021	(-.686, -.056)
BS-pleasant	.045	.34	.734	(-.216, .306)
BS-meaning	.233	1.39	.164	(-.095, .560)
BS-unaware	.074	.80	.424	(-.107, .254)
BS-sex	-.005	-.04	.968	(-.227, .218)
BS-fantastical	.000	.00	.1.00	(-.276, .276)
Constant	1.524	2.74	.006	(.433, 2.615)

Note: Data represent only episodes when participants reported they were daydreaming at the moment prior to being probed. Abbreviations: BS- = between subjects, WS- = within subjects.

Table 23. Within- and between subject predictors of end-of-day inspiration among non-writers.

Variable	<i>b</i>	<i>z</i>	<i>p</i>	95% CI
Level 1 predictors				
Time (probe counter)	-.013	-2.52	.012	(-.024, -.003)
WS-curious	.014	.70	.486	(-.026, .054)
WS-planning	.021	1.06	.287	(-.017, .059)
WS-pleasant	.027	1.53	.126	(-.008, .061)
WS-meaning	.005	.24	.807	(-.035, .044)
WS-unaware	.023	1.09	.276	(-.018, .064)
WS-sex	.000	.01	.990	(-.033, .034)
WS-fantastical	.037	1.54	.124	(-.010, .084)
Level 2 predictors				
BS-curious	.434	2.88	.004	(.139, .730)
BS-planning	-.405	-2.57	.010	(-.714, -.096)
BS-pleasant	.158	1.21	.227	(-.098, .413)
BS-meaning	.449	2.74	.006	(.128, .770)
BS-unaware	.139	1.53	.125	(-.039, .316)
BS-sex	.112	1.01	.313	(-.106, .330)
BS-fantastical	-.094	-.68	.498	(-.365, .118)
Constant	.620	1.14	.256	(-.449, 1.689)

Note: Data represent only episodes when participants reported they were daydreaming at the moment prior to being probed. Abbreviations: BS- = between subjects, WS- = within subjects.

Results for the writers are shown in Table 24 (daily creative behavior) and Table 25 (daily inspiration). In this group, we did not find between-subjects level effects on creative behavior, nor did writers become less creative over the course of the study. However, within-subjects fluctuations in curious and pleasant daydreaming predicted daily creative behavior. That is, writers were more creative on days when they experienced more curious and more pleasant daydreams. For inspiration, both between- and within-subjects variations in pleasant daydreaming were significant predictors. Thus, writers who generally reported more pleasant daydreaming (relative to others) reported more inspiration, and on days when they experienced more pleasant daydreaming than usual, their level of inspiration was also increased.

Table 24. Within- and between subject predictors of end-of-day creative behavior among writers.

Variable	<i>b</i>	<i>z</i>	<i>p</i>	95% CI
Level 1 predictors				
Time (probe counter)	-.006	-1.10	.273	(-.015, .004)
WS-curious	.043	2.27	.002	(.006, .080)
WS-planning	.011	.63	.531	(-.024, .047)
WS-pleasant	.039	2.58	.010	(.009, .069)
WS-meaning	-.036	-1.82	.069	(-.074, .003)
WS-unaware	.019	1.01	.313	(-.018, .055)
WS-sex	.002	.16	.875	(-.026, .030)
WS-fantastical	.010	.55	.585	(-.027, .048)
Level 2 predictors				
BS-curious	.248	1.37	.171	(-.107, .602)
BS-planning	-.002	-.02	.987	(-.302, .297)
BS-pleasant	.201	1.41	.159	(-.079, .481)
BS-meaning	.162	1.02	.308	(-.149, .472)
BS-unaware	-.042	-.46	.648	(-.223, .139)
BS-sex	.114	1.01	.313	(-.108, .336)
BS-fantastical	.101	.75	.455	(-.164, .366)
Constant	.912	1.38	.168	(-.385, 2.210)

Note: Data represent only episodes when participants reported they were daydreaming at the moment prior to being probed. Abbreviations: BS- = between subjects, WS- = within subjects.

Table 25. Within- and between subject predictors of end-of-day inspiration among writers.

Variable	<i>b</i>	<i>z</i>	<i>p</i>	95% CI
Level 1 predictors				
Time (probe counter)	-.001	.30	.762	(-.007, .010)
WS-curious	.018	.94	.347	(-.020, .056)
WS-planning	.028	1.53	.126	(-.008, .064)
WS-pleasant	.058	3.78	.000	(.028, .089)
WS-meaning	-.018	.92	.360	(-.057, .021)
WS-unaware	.002	.11	.916	(-.035, .039)
WS-sex	.000	.04	.966	(-.028, .029)
WS-fantastical	.024	1.23	.218	(-.014, .062)
Level 2 predictors				
BS-curious	.304	1.83	.098	(-.022, .629)
BS-planning	.238	1.70	.090	(-.037, .515)
BS-pleasant	.295	2.24	.025	(.037, .552)
BS-meaning	.042	.29	.770	(-.242, .327)
BS-unaware	-.100	-1.18	.237	(-.267, .066)
BS-sex	.031	.30	.766	(-.173, .235)
BS-fantastical	.172	1.38	.167	(-.072, .417)
Constant	.168	.28	.783	(-1.027, 1.363)

Note: Data represent only episodes when participants reported they were daydreaming at the moment prior to being probed. Abbreviations: BS- = between subjects, WS- = within subjects.

General Discussion

This research explored the relationship between daydreaming and creativity. While most research on this topic focuses on daydreaming frequency, we examined its qualities, and in particular, curiosity. Studies 1 and 2 established curious daydreaming as a distinct type of daydreaming that predicts creative behavior and achievement in community samples. The only other type of daydreaming that consistently predicted creativity was daydreaming that revolves around bizarre and fantastical contents. In Study 3, we compared the daydreams of professional creative writers to those of a less creative control group. Writers exhibited more curious and fantastical daydreaming, indicating that the link between curious and fantastical daydreaming and creativity extends to professional levels of creativity. The only other difference was that writers reported more sexual daydreams, at least during experience sampling. This might reflect a greater willingness to report honestly on their most intimate thoughts, or it may reflect true differences in personality. Interestingly, the writers also reported more daydreaming overall. This could be due to the nature of their work, which may involve purposeful daydreaming as part of their creative writing process (Seli, Carriere, & Smilek, 2015).

Study 3 revealed communalities—and interesting differences—in the types of daydreams that predicted creativity among writers and non-writers. While curiosity was the only predictor of creative achievement among non-writers, this effect was only marginally significant in writers. Moreover, in writers, fantastical and unaware daydreaming emerged as predictors of creative achievement. The reason curious daydreaming was a stronger predictor of creative achievement among non-writers could be that writers, as a group, already exhibit higher levels of curious daydreaming, and less between-subjects variation.

The experience sampling data, too, revealed communalities and notable differences between writers and non-writers. Curious daydreaming predicted daily creative behavior in both groups. However, among the non-writers, this was driven by individual differences *between* participants—meaning those who exhibited more curious daydreams relative to others reported more creative behavior. Among writers, we did not find this between-subjects effect. However, on days when writers

experienced more curious daydreams than usual, they were more creative. Moreover, both individual differences and daily fluctuations in pleasant daydreaming predicted writers' feelings of inspiration. This could indicate that curious and pleasant daydreaming contribute to writers' creative behavior and inspiration. Alternatively, creatively productive days could lift the writers' mood and inspire more curious and pleasant daydreams.

This research has several limitations. Although we studied a large sample of professional writers, this likely did not include many distinguished writers, since we did not personally recruit famous writers. We find clear differences between our groups in creative behavior and achievement, but it would be interesting to see if our findings generalize to truly celebrated creative individuals. Another limitation is that our study relies on self-report measures of creativity. In future studies, it would be valuable to objectively test creative writing ability or administer other creative performance measures.

Despite these limitations, the present findings strongly suggest that creative individuals are distinguished by particular kinds of daydreams. Specifically, individuals with more creative accomplishments tend to have more fantastical daydreams and are more likely to daydream about questions that have captured their curiosity. Furthermore, curious daydreaming not only characterizes creative individuals in general, but is prevalent on days in which individuals are particularly inspired.

Declarations

Transparency and availability of data and materials

All materials and data can be downloaded from
https://osf.io/zsyem/?view_only=19a9113367984ec38106f2238f12a137

Funding

This research was supported by grants RFP-15-09 from the Imagination Institute and #60844 from the John Templeton Foundation.

Conflicts of interest/Competing interests

The authors declare that they have no conflict of interest.

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