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Registered Report: Do individual differences in cognitive ability or personality predict noticing in inattentional blindness tasks?

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Keywords: inattentional blindness, individual differences, ability, personality, memory, attention, perception, consciousness

NOTE TO EDITOR AND REVIEWERS

The method and results section for this Stage-1 manuscript are written as if the data have already been collected (they haven't). We use this approach for registered reports because it makes clear exactly what the paper will say for different outcomes after data collection and it minimizes the textual changes from the stage-1 to the stage-2 manuscript. In the sections below, we use **BOLD BLUE** to indicate a note of explanation about reporting that will not be in the actual manuscript (sometimes followed by regular blue text in quotes to show the contingent wording). We use **Red** to indicate a placeholder for actual values. When there are multiple options for prose depending on the observed outcome, we surround the text in brackets and use a pipe symbol to indicate different possibilities: [option 1 | option 2 | option 3]. Any analyses not explicitly described below will be flagged at stage-2 as motivated by the analyses or inspection of the data (or as "exploratory" when that term is more appropriate). Note that figures and tables might be combined, separated, or restructured. The figures are meant to convey the type of information content that will be presented, not the actual results. The numbering of tables and figures may be changed at Stage 2 if we merge/separate figures or add additional figures. We may convert the manuscript to RMarkdown at Stage 2 so that the analyses and figures will be fully reproducible.

Abstract

People often fail to notice unexpected objects or events when they focus attention on another task or different aspects of a scene. Recently, a number of studies have examined whether individual differences in cognitive abilities or personality can be used to predict who will notice and who will miss unexpected objects. Although such measures can predict performance on deliberate attention tasks where people actively attend to or search for objects, a recent series of meta-analyses (Simons et al., 2024) showed relatively little evidence that individual differences predict noticing of unexpected objects in inattentional blindness tasks. In part, the evidence is limited and heterogeneous because most studies tested relatively small numbers of participants. This registered report presents the two largest individual difference studies to date, separately measuring cognitive ability (n=xx) and personality (n=xx) predictors that prior evidence suggested might predict inattentional blindness. Collectively, we found [**insert brief results summary here**]. All data and materials for this research are available at https://osf.io/z2fdu/?view_only=38842af20b8449dc9eefeb156d23912e.

Registered report: Do individual differences in cognitive ability or personality predict noticing in inattentional blindness tasks?

INTRODUCTION

Inattentional blindness is a failure to notice an unexpected object when performing an unrelated, attention-demanding task (Mack & Rock, 1998). Such failures of awareness occur for objects and tasks ranging from simple, briefly flashed shapes on computer displays (Mack & Rock, 1998) to videos (e.g., Simons & Chabris, 1999) to real objects or events in daily life (e.g., Chabris et al., 2011; Hyman et al., 2010). Although not labeled as such, inattentional blindness has been documented in research for more than a century (Cornell, 1959; Munsterberg, 1908; Neisser & Becklen, 1975). Only more recently—the past 30 years—have researchers systematically examined the factors that affect noticing and missing, with most evaluating how the primary task and the nature of the unexpected event influence noticing rates. For example, studies have varied the similarity of the unexpected object to the attended and ignored items in a display (Ding et al., 2023; Most et al., 2001), the spatial proximity of the unexpected object to the attended items (Newby & Rock, 1998; Most et al., 2000), the difficulty or cognitive demands of the primary task (e.g., Simons & Jensen, 2009), or the distinctiveness or salience of the unexpected object (e.g., Most et al., 2001). Other studies have examined how the observer's expectations or attention set affect noticing while keeping the visual components of the task constant (Most et al., 2005). Collectively, these studies show that the likelihood of noticing can vary widely with the nature of the primary task and unexpected object, and that systematic variation of factors like similarity or distinctiveness can consistently produce large differences in the likelihood of noticing unexpected objects, spanning the full range from nobody noticing to everybody noticing (see Hutchinson et al., 2022 for a recent review).

Perhaps the most common question asked by people upon first learning about inattentional blindness is whether some people are more likely than others to notice unexpected objects and events. The fact that noticing rates decline as the cognitive demands of the primary task increase raises the possibility that people who are better able to perform cognitively demanding tasks might be more likely to notice an unexpected object. Presumably, participants who find the primary task easier to perform should be more likely to notice because, for them, the more difficult task is comparable to a simpler task for other participants. Yet, a number of studies have found little association between how well people can perform a dynamic tracking task like that used as the primary task in sustained inattentional blindness studies and how likely they are to notice an unexpected object (Bredemeier & Simons, 2012; Simons & Jensen, 2009). The lack of such an association has raised questions about whether individual differences in inattentional blindness can be reliably measured using standard paradigms, and if so, whether differences in cognitive ability can predict noticing of unexpected objects.

Our research team (Simons, Hults, & Ding, 2024) recently conducted a review of all empirical inattentional blindness studies that reported performance on a cognitive ability or personality measure separately for noticers and missers (or correlated noticing with an individual difference measure). Given that inattentional blindness is defined as a failure to notice an unexpected object, most studies of inattentional blindness can examine noticing only once for each participant—once participants are asked whether they saw an object, they will expect additional objects to appear on future trials of the same task. Consequently, most studies of individual differences in inattentional blindness examined whether people who noticed or missed an unexpected object on a single critical trial differed on other measures of ability or personality.

We identified 38 empirical papers that reported at least one such individual difference measure and meta-analyzed all measures that were reported for two or more independent samples of participants.

Although the vast majority of cognitive ability measures showed almost no difference for noticers and missers, a few showed possible effects in at least a couple of samples or showed a high level of heterogeneity across samples. The two cognitive predictors tested with the most samples included the Operation Span (OSpan) measure of attentional control and working memory and variants of the Raven's Progressive Matrices task, a common measure of fluid intelligence. OSpan was tested with 28 samples across 14 different articles, and higher OSpan scores were weakly associated with greater noticing ($r = 0.077$ [0.002 – 0.151], total $n=2206$), but there was substantial heterogeneity in the estimated association across samples. The individual samples contributing to the meta-analysis reported positive correlations as large as $r(14) = 0.524$ and negative correlations as large as $r(54) = -0.201$. However, the positive effects suffered from a small sample effect—bigger effects for smaller samples—and after correction for publication bias, the effect was closer to zero (Trim and Fill: $r = -0.001$; limit meta-analysis: $r = -0.012$; Bayesian meta-analysis: $d = 0.002$ [-0.205; 0.189]). Several other span tasks also showed positive effects, but they were measured only in 4 samples from a single article, so it is not clear whether those effects would be robust.

Variants of the Raven's Matrices task were included in 21 samples across 5 articles (total $n=755$), most by a single laboratory testing relatively small samples of children of different ages (e.g., Zhang et al., 2017, 2019). The overall effect estimate was $r = 0.087$ [-0.039; 0.210], but the two samples with adults showed larger effects ($r(34) = 0.432$ and $r(193) = 0.160$). Most other individual difference tasks produced substantially smaller meta-analytic effects or were measured in only a small number of samples from a single paper. Across all of the studies of cognitive individual differences, most measures were tested in only a few samples, and most of the samples were small.

In sum, our meta-analytic review of cognitive ability predictors showed little consistent evidence for individual differences in noticing, but several measures produced small associations with substantial heterogeneity. Most samples in the review were small, few of the studies were preregistered, and the only measure reported in more than 10 articles (OSpan) showed possible evidence of publication bias. Most of the individual studies contributing to these meta-analyses were underpowered to detect the observed meta-analytic effect sizes.

Although the existing literature does not provide compelling evidence that individual differences in cognitive ability are associated with noticing in inattentional blindness tasks, those same cognitive ability measures are associated with performance on deliberate attention tasks. Individual differences in OSpan performance, for example, are associated with better visual search (Barrett, Tugade, & Engle, 2004), a reduced attentional blink (Willems & Martens, 2016), reduced negative priming (Conway, Tuholski, Shisler, & Engle, 1999), better ability to ignore similar distractors (Conway, Cowan, & Bunting, 2001; but see Minamoto, Shipstead, Osaka, & Engle, 2015), and reduced attention capture in an anti-saccade task (Unsworth, Schrock, & Engle, 2004). More generally, individual differences in attentional control tasks are associated with differences in working memory capacity and fluid intelligence (Tsukahara, Harrison, Draheim, Martin, & Engle, 2020).

All of these associations appear to share an emphasis on deliberate, intentional performance, whereas the primary measure in an inattentional blindness task is noticing of objects that explicitly fall outside the participants' intentions and attention. That is, in all of these cases, participants know that the additional object will appear and either deliberately try to ignore it or try to minimize its influence on their primary task performance. In an inattentional blindness task, though, participants do not know that an additional object might appear. As long as the additional object is entirely unexpected, they have no reason to intentionally devote attention to it in advance (Mack & Rock, 1998). That distinction might explain the lack of evidence that individual differences in cognition predict noticing of unexpected objects, but the lack of a consistent effect might also be due to testing of small samples with varied methods.

Although fewer articles in our review measured personality, and none of the personality scales were tested in more than 6 samples, the sample sizes used typically were larger (several samples included more than 100 people), meaning that they might provide more robust estimates of the association with noticing. Across studies, most personality measures were weakly associated with noticing, with the largest sample in the meta-analyses (n=554; Kreitz et al., 2015) observing small or null effects. Of the Big-5 personality dimensions, open-mindedness showed the largest effect (r = 0.037 [-0.095, 0.169], n=776 across 3 samples), with the other dimensions showing correlations smaller than r=±0.015. Various other measures of anxiety, emotion, and affect showed similarly small associations (rs < .15), often tested with smaller samples. The only measure tested with a sizable number of participants (n=711, 3 samples) and finding a larger meta-analytic correlation (r = -0.344 [-0.729, 0.041]) was absorption. For that measure, the largest sample showed no effect (r(554) = 0.010) and the two smaller samples found substantial negative effects (r(66) = -0.420 and r(91) = -0.557).

Many of the scales used as personality predictors were included as part of standard task batteries used in studies of anxiety and depression (Bredemeier et al., 2014), in part because anxiety has been linked to greater distractibility when participants try to ignore known distracting elements in a focused attention task (see Eysenck et al., 2007 for a review). In those cases, the batteries included other measures of emotionality and affect because they were part of standard task batteries used for research on anxiety and depression (e.g., the PANAS), and not because they were specifically predicted to be associated with inattentional blindness. Because the collection of tasks used to measure personality in many of these studies was driven by other considerations, they did not measure personality factors that have face validity as potential predictors of inattentional blindness. For example, none of the studies included measures that specifically focus on individual differences in inattention and distractibility (e.g., ADHD), traits that we might expect to be associated with attention to task-unrelated aspects of a display. Similarly, none of the studies included measures of traits like obsessiveness that might predict the tendency to focus more intently on a primary task, resulting in less detection of unexpected objects or events.

The primary goal of this registered report manuscript is to provide two, large-sample, preregistered studies of individual differences in noticing. Study 1 examines whether individual differences in cognitive abilities (OSpan, Rotation Span, and matrix reasoning) predict noticing on three different types of inattentional blindness tasks. The matrix reasoning task provides a non-verbal measure of fluid intelligence, and OSpan and Rotation Span provide measures of different aspects of attentional control and working memory. Study 2 examines personality predictors, including absorption and the Big-5 personality dimensions used in earlier studies as well as personality scales that measure aspects of personality that have some face validity as predictors of noticing: ADHD and obsessiveness. Each study provides the largest single-sample test of whether individual differences predict noticing on inattentional blindness tasks.

Unlike in most other studies, we also measured inattentional blindness with three distinct tasks, one of which includes a manipulation of task difficulty. Both studies include variants of the two most commonly used computer-based inattentional blindness tasks, the transient task originally developed by Mack and Rock (1998) and the sustained task first used by Most and colleagues (2001). In the transient task, participants judge which arm of a briefly flashed cross is longer, and another shape appears during the critical trial. In the sustained task, participants count the number of times a subset of the shapes in the display bounce off the sides of a rectangular window, and an unexpected object traverses the display on the critical trial. In the third task, a visual search variant originally developed by Cartwright-Finch and Lavie (2007), participants search for a target letter in a circular array, and on a critical trial, an additional letter appears where the fixation point had previously appeared. This task has not been used frequently in the published inattentional blindness literature, but we included it to have an additional measure of the key construct.

Using inattentional blindness tasks with different materials and primary task demands, separated by other tasks, should decrease the chances that participants will expect an additional object in the second and third task they complete. This design allows us to address the empirical question of whether we can include multiple inattentional blindness tasks without participants actively searching for additional objects in subsequent tasks. It also allows us to evaluate individual differences in the likelihood of noticing unexpected objects. By including three tasks, randomizing the order, and directly measuring whether participants expected an additional object on the critical trial of each task, we can determine whether people who notice the object on one inattentional blindness task tend to be the same people who notice it on other tasks. If they are sufficiently correlated, we can use them to create an aggregate measure of inattentional blindness.

We also can evaluate whether one form of inattentional blindness task is more strongly associated with other measures of cognition and personality. In our review (Simons et al., 2024), an exploratory analysis of the OSpan measure suggested a slightly larger association with noticing in the transient task (r = 0.12 [-0.01, 0.24]; 7 samples; total n=374) than in the sustained task (r = 0.07 [-0.02, 0.24]; 21 samples; total n=1832). None of the other measures in that review had enough data with each type of task to analyze such differences (and no individual difference studies used the search task).

For the sustained task, our design also includes a common manipulation of task difficulty: keeping one total count or two separate counts of the attended items (e.g., count all of the bounces by the white shapes or keep separate counts of the white disks and white squares). Prior research shows reduced noticing when the primary task is more difficult (e.g., Simons & Chabris, 1999; Simons & Jensen, 2009), so our design should replicate that finding. Including this manipulation also allows us to test whether individual differences in cognitive ability are more likely to predict noticing when the task difficulty is high. We might expect little effect of individual differences in cognitive ability when all participants can perform the primary task with relative ease.

Finally, unlike many previous studies, our sample sizes (n=1000 per study) are large enough to evaluate whether individual differences in accuracy on the primary task (on the pre-critical trials) are associated with noticing of the unexpected object on the critical trial. The few studies that have examined whether counting accuracy in a sustained inattentional blindness task predicts noticing (e.g., Bredemeier & Simons, 2012; Simons & Jensen, 2009) generally tested small samples and reported weak associations.

By including multiple individual difference measures in a single study, we can also verify the validity of our measures by testing whether we observe other associations regularly found in the literature (reported in the Appendix). For example, OSpan typically shows a moderate correlation with performance on measures of fluid intelligence like matrix reasoning tasks (e.g., Conway et al., 2005; Unsworth & Engle, 2005); performance on different span tasks tends to be positively correlated (e.g., Foster et al., 2015); and the Big-5 dimension of open-mindedness tends to be correlated with standard measures of absorption because they tap similar constructs (McCrae, 1993).

In sum, this registered report tests the largest samples to date to address a number of open questions about the reliability of inattentional blindness and whether individual differences predict noticing. And it includes built-in checks on the validity of the measures by allowing us to replicate known associations.

Our study will address the following research questions:

1. Are people who notice an unexpected object in one inattentional blindness task more likely to notice an unexpected object in a different sort of inattentional blindness task?
2. Is noticing of unexpected objects associated with individual differences in performance on cognitive ability measures (matrix reasoning task, OSpan, Rotation Span)
3. Is noticing of unexpected objects associated with individual differences in measures of personality?
4. Can all of the cognitive ability measures collectively predict noticing of unexpected objects?
5. Can all of the personality measures collectively predict noticing of unexpected objects?
6. Are individual differences more predictive of noticing for some inattentional blindness tasks than others, and do the same individual differences predict noticing across tasks?
7. Are individual differences in cognitive measures associated with noticing on the divided attention trials of the inattentional blindness tasks.
8. Can individual items from the personality measures be combined to create a new scale that distinguishes people who do and do not notice unexpected objects?

GENERAL METHOD

This article was published as a registered report, meaning that the introduction, method, and analysis plan were reviewed prior to data collection, and the provisionally accepted stage-1 manuscript served as a preregistered plan for the study. The preregistered stage-1 manuscript as well as all code, materials, and data are available at https://osf.io/z2fdu/?view_only=38842af20b8449dc9eefeb156d23912e. The protocol was reviewed by the Institutional Review Board at the University of Illinois (protocol #IRB24-0262) and deemed exempt under Category 3 of the Common Rule.

PARTICIPANTS

Study 1 (cognitive predictors) and Study 2 (personality predictors) were conducted successively. We aimed to collect usable data from a total of 1000 participants in each study using Prolific. We set no restrictions on who could participate other than requiring all participants to be over 18 years of age and to report being fluent in English. We used settings to automatically exclude Prolific users who had completed any of our prior Prolific studies assessing inattentional blindness. Participants in Study 1 were automatically excluded from eligibility for study 2.

In each study, we posted available slots in blocks of 100, waiting until all 100 slots were filled before posting the next block. After posting a total of 1000 slots, we determined how many participants had completed all of the required tasks. If any participants had not, we posted a block of additional slots to reach a total of 1000, repeating those steps until we obtained complete data from 1000 participants or we exhausted half of our available funding for participant payments. [**If we exhaust our funding, we will note that here and report the total sample.**]

SAMPLE SIZE JUSTIFICATION

We chose a sample size of 1000 for each study for several reasons. First, we have conducted simulations to show that with a sample size of 100 participants per condition in an inattentional blindness study, we can estimate the percentage of noticers within approximately 10% precision (see Ding et al., 2023). Given that we only have one between-groups factor of interest for our inattentional blindness tasks (primary task difficulty for the sustained task), along several counterbalancing factors that will be reported but are not of substantive interest, this sample size should give us adequate sensitivity to measure noticing in each condition of each inattentional blindness task.

Because we will be examining individual difference correlations with performance on those conditions, we also assessed the precision with which we could measure point-biserial correlations of different magnitudes as a function of sample size (see the osf project for the code used in these calculations and provides estimates for other correlation values). For a true correlation of r=0, we expect 95% of correlations with a sample size of n=500 to be smaller than r=±0.088 (for n=1000: ± 0.062; for n=2000: 0.044). The precision of measurement increases with larger correlations. With a true population correlation of r = 0.80, the expected sample correlations would fall within ±0.026, ±0.018, and ±0.013 of r = 0.80 for sample sizes of 500, 1000, and 2000, respectively. For most of the individual differences associations in our study, we targeted a sample size of n=1000, but even with our smallest target sample size for an individual difference association (n=500), we can estimate correlations precisely: If there truly is no correlation between noticing and an individual difference measure, with n=500, we would only observe correlations larger than r = 0.09 about 5% of the time and we would observe correlations larger than r = 0.12 only 1% of the time.

In short, we chose a sample size that would provide a more precise estimate of individual differences than any previous study of any individual difference predictor of inattentional blindness, most of which tested small numbers of participants (median n=44 per between-groups sample and only two studies had n > 200; the maximum sample size was n=554 for a study of personality differences; our total sample for personality measures is substantially larger than that maximum sample size; Simons et al., 2024).

STUDY PRESENTATION

Given that both Studies 1 and 2 include the same three inattentional blindness tasks and have a similar structure, we first present the methods and procedures for both Study 1 and Study 2 in order to minimize repetition. We then present a single, consolidated results section in which we first combine across studies for analyses of the inattentional blindness tasks and then analyze individual differences. Table 1 summarizes the primary and secondary outcomes for all of the tasks used across the two studies.

Table 1. *List of measures and specified primary outcome.*

Measure	**Primary Outcome**	**Secondary/Robustness outcomes**	**Additional measures**
Transient Inattentional Blindness	noticing	More conservative noticing criterion and accuracy exclusion	Accuracy on pre-critical trials, noticing on divided attention trial
Sustained Inattentional Blindness	noticing	More conservative noticing criterion and accuracy exclusion	Accuracy on pre-critical trials, noticing on divided attention trial
Search Inattentional Blindness	noticing	More conservative noticing criterion and accuracy exclusion	Accuracy on pre-critical trials, noticing on divided attention trial
TestMyBrain Matrices	Total score out of 8		Percent correct for each matrix problem
OSpan	Absolute score	Total score	Math accuracy
Rotation Span	Absolute score	Total score	Normal/Reversed Accuracy
BFI-2	Total scores for each domain		Facet scores
MPQ-Absorption	Total score		
ASRS-Inattention	Total score		
FFOCI-Fastidiousness	Total score		
FFOCI-Perfectionism	Total score		
FFOCI-Punctiliousness	Total score		

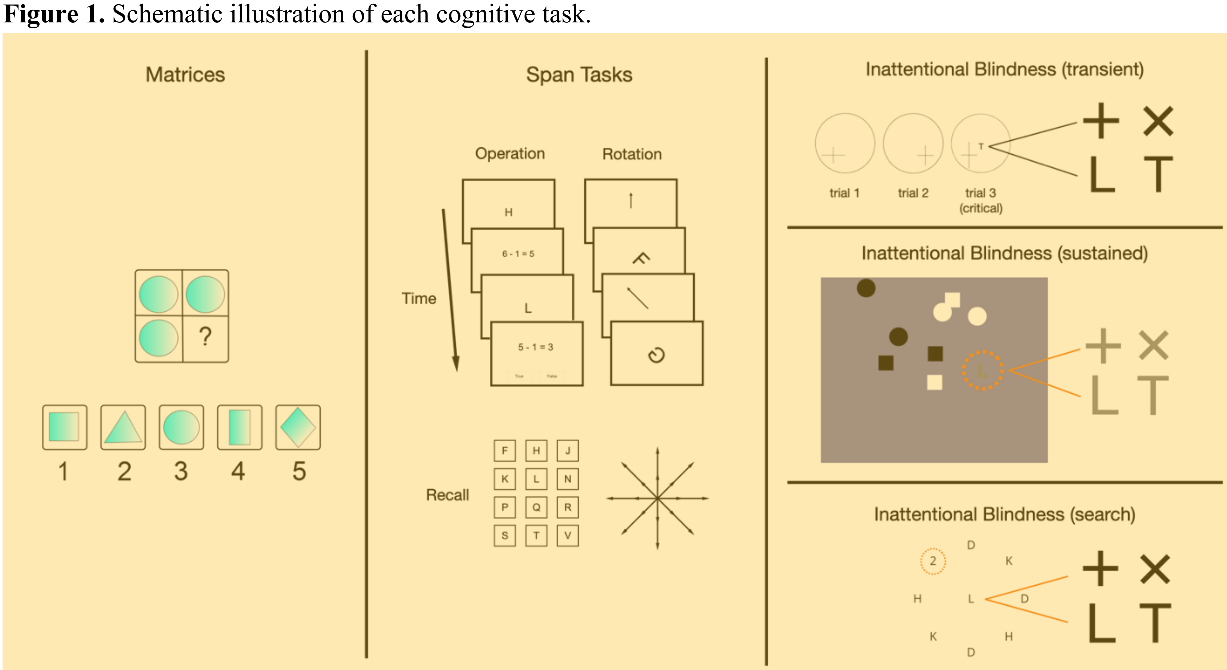
STUDY 1 — METHOD AND PROCEDURES

Study 1 examined whether individual differences in cognitive abilities (span tasks and matrix reasoning) predicted noticing on three different inattentional blindness tasks. In total, xx signed up for slots on Prolific and xx completed all of the tasks and were included in analyses. Participants were paid $5 for completing the full study (which typically took xx minutes). [**We will start with a payment amount of $5 for pilot testing of the tasks (pilot data won't be included in the analyses). If the rate of recruiting would mean that we could not reasonably complete the testing within 2 weeks or if the median completion time is longer than anticipated, we will increase the payment amount and will note that here.**] All data were collected between DATE1 and DATE2.

TASKS & DESIGN

Each participant completed all of the tasks described below. At https://osf.io/z2fdu/?view_only=38842af20b8449dc9eefeb156d23912e, readers can view demo versions of each task that do not record data. Figure 1 shows schematic timelines for each of the cognitive tasks.

Figure 1. Schematic illustration of each cognitive task.



Transient inattentional blindness: This task was a javascript adaptation of the task originally devised by Mack and Rock (1998) that has been used in other studies from our laboratory (Ding et al., 2024). On each trial, participants judged whether the horizontal or vertical line of a briefly flashed cross was longer. Trials began with a black fixation circle (diameter=10 pixels) at the center of a black outline circle (diameter=500 pixels). After 1000ms, a cross appeared centered in one of the 4 quadrants of the circle (randomly selected), with the center of the cross positioned 100 pixels vertically and horizontally from the center of the circle. The lines of the cross were 2 pixels thick, and the lengths of each line were chosen randomly from the following possibilities with the constraint that the two lines differ in length: 135 pixels, 165 pixels, 195 pixels, 225 pixels. After 200ms, a pattern mask that filled the circle appeared for 500ms, and then participants used their mouse to select the arm of the cross that was longer. The first three trials included only the cross-judgment task. On the fourth, critical trial, an unexpected shape appeared at fixation, replacing the fixation circle, and remained on screen simultaneously with the cross. The shape was chosen at random from the following possibilities: +, X, L, T. Each shape was sized to have the same vertical and horizontal extent of 80 pixels. After participants reported which arm of the cross was longer, they were asked the following two questions each shown on its own screen:

1. Did you notice an additional object during the last cross-judging trial that wasn't there the first three times? [Yes/No]

2. There actually was an extra object. If you saw it, please select the object you saw. If you didn't see it, please guess. [+, X, L, and T displayed in a randomly ordered list]

3. When you were completing that last trial, were you devoting some of your attention to looking for an additional object? [No, I was focused on judging which line was longer and was not looking for an additional object / Yes, I was looking for an additional object while also judging which line was longer]

Following this critical trial, participants performed one more trial that was identical to the critical trial with the same additional object, but with the cross position again chosen randomly. That trial served as a measure of divided attention because participants knew to look for an additional object. Participants were asked the same three questions about the additional object following the divided attention trial.

Sustained inattentional blindness: This task was a javascript adaptation of the tracking task first introduced by Most and colleagues (2001) and used in other studies in our laboratory (Ding et al., 2023). The display on each trial consisted of 2 white disks, 2 white squares, 2 black disks, and 2 black squares appearing against a blue rectangular window (666 × 546 pixels; rgb fill color: #7676A7). The shapes had a width and height of 44 pixels. The shapes were randomly positioned at the start of each trial and then began moving linearly on trajectories parallel to the diagonals of the rectangle, with the direction and diagonal chosen randomly for each shape. Each time a shape encountered the edge of the rectangle, it rebounded at an angle of 90 degrees and its velocity changed (speeds varied randomly between 54 and 108 pixels per second). The shapes occluded each other when they overlapped, with the depth order chosen randomly on each trial. Over the course of a 19-second trial, each shape bounced approximately 4-7 times. Participants were randomly assigned to maintain a single count of all bounces by the white shapes or to maintain separate counts for the white disks and white squares. All participants ignored bounces by the black shapes. After each trial, they were asked to report their tallies. Each participant completed the same task for three trials. On the third trial only, after 6 seconds of motion, an additional object unexpectedly entered the display from one side, moved horizontally along the midline of the rectangle, and exited the display 10 seconds later. Whether the object moved from right to the left or vice versa was determined randomly for each participant. The unexpected object was one of four randomly assigned shapes: +, X, L, T. Each shape was sized to have the same vertical and horizontal extent of 44 pixels. After the motion ended on the critical trial, participants were again asked to report their count(s). They then were asked the following questions:

1. Did you notice an additional object during the last bounce-counting trial that wasn't there the first two times? [Yes/No]

2. There actually was an extra object. What was the shape of the extra object? If you saw it, please select the object you saw. If you didn't see it, please guess. [+, X, L, and T displayed in a randomly ordered list]

3. When you were completing that last trial, were you devoting some of your attention to looking for an additional object? [No, I was focused on counting the bounces and was not looking for an additional object / Yes, I was looking for an additional object while also counting the bounces]

Following the critical trial, participants completed a divided attention trial with the same additional object moving in the same direction, followed by the same three questions about the additional object. Finally, given that this task involved animation, participants were asked at the end of the task whether they had experienced any playback problems during the task, and if so, to describe the problem.

Search inattentional blindness task: This task is a javascript-adapted version of a search inattentional blindness task adapted from one introduced by Cartwright-Finch and Lavie (2007). Each trial started with a fixation asterisk (10-pixel diameter) in the center of the display window for 1 second. After a blank-screen delay of 300ms, a search array appeared for 500ms. The array consisted of a circular arrangement of 1 integer “target” (randomly chosen from the numbers 1-8) and 7 non-targets (each randomly chosen from D, H, or K). **[Note: we will pilot test and we might adjust the non-targets—their identities and/or the number of unique non-target types—in order to calibrate noticing to approximately 50%.]** The position of the search target was randomized on each trial. Participants responded by pressing “e” if the number was even and “o” if it was odd. Participants completed 3 practice trials with “correct/incorrect” feedback, followed by 5 search trials without feedback. On the ninth, critical trial, an additional object appeared at fixation for the full 500ms that the search array was on screen (randomly selected from +, X, L, and T). Immediately after participants responded odd/even, they answered the following questions:

1. Did you notice anything extra during the last search trial that wasn’t there in the previous trials? [Yes/No]

2. There actually was an extra object. What was the shape of the extra object? If you saw it, please select the object you saw. If you didn’t see it, please guess. [+, X, L, and T displayed in a randomly ordered list]

3. When you were completing that last trial, were you devoting some of your attention to looking for an additional object? [No, I was focused on searching for the number and was not looking for an additional object / Yes, I was looking for an additional object while also searching for a number]

Following the critical trial, participants completed a divided attention trial with the same additional object, followed by the same three questions about the additional object.

Matrix reasoning: This task is a javascript-adapted version of the TestMyBrain Matrices Test (Richler, Wilmer, & Gauthier, 2017; Passell et al., 2019), which itself is modeled after the matrix task in the Wechsler Abbreviated Scale of Intelligence II (see Wechsler, 2011). The task is similar to the Raven’s Progressive Matrices task and is considered to be a non-verbal measure of fluid intelligence. The full TestMyBrain Matrices task includes 35 reasoning problems in which participants select which of the shown images best completes a visual pattern. We used the 8-item version of the TestMyBrain task (items 7, 17, 22, 25, 27, 28, 31, and 35 which had the highest correlation with a total score across all items; the 8 items in that version of the task also are among those with the highest correlations with SAT-math, and the total scores on that version correlate with SAT-math at $r = 0.34$) with items ranging in difficulty from 94.9% correct to 39.5% correct according to the TestMyBrain norms (short-version Spearman-Brown split-half reliability = 0.62 from norming data provided by Jeremy Wilmer; the full version has a split-half reliability of 0.89 and alpha = 0.77; Passell et al., 2019). In addition to the 2 practice items normally used in the task, we also used items 1 and 2 as practice items, so the task starts with 4 practice items followed by the 8 items that increase in difficulty.

OSpan: On each trial of this "operation span" task, participants view a sequence of 3-7 letters that they will need to recall in order (alpha = 0.78; test-retest reliability = 0.83; Unsworth & Engle, 2005). Immediately before each letter, participants see a simple arithmetic problem such as "(7 * 3) - 2," and they have to judge whether the proposed solution (e.g., "18") is correct or incorrect by clicking the "True" or "False" button. All of the math operations result in a correct answer that is ≥ 0. Participants respond to the letter memory task by using a mouse to select letters in the correct order from a 4x3 matrix showing all possible letters (F, H, J, K, L, N, P, Q, R, S, T, and V). Participants practice the letter memorization 3 times each with 3-5 letter sequences followed by 5 math problems. They then complete 2 practice trials with a 3-4 letter sequence followed by 5 test trials, each with sequences of length 3-7.

Rotation Span: This task is structured similarly to the OSpan task (alpha = 0.87 for the full-length version and 0.66 for a shorter version; Foster et al., 2015). Participants try to remember an ordered sequence of short or long arrows pointing in one of eight possible directions. In place of the math problem judgments used in the OSpan task, the distractor task in Rotation Span asks participants to judge whether a rotated letter is normal or the mirror image reflection of a normal letter (using "Normal" for normal and "Mirrored" for mirror-reversed). Participants first practice the arrow memorization 3 times each with a sequence of 3-5 different arrows followed by 5 rotation judgment problems. Participants then complete 2 practice trials with a 3-4 block sequence followed by 5 test trials, each with block sequences of length 2-5.

Demographic measures: Following completion of all tasks, participants reported their age and country of current residence from drop-down menus and reported their gender with a free-text response. They also reported whether or not their vision requires correction and whether they were using glasses or contacts during the experiment.

PROCEDURE

Prior to beginning the study, participants reviewed an information screen that explained that they would be completing a series of tasks, that their participation was voluntary and compensated, that their responses would be anonymous, that their data would be shared publicly after any identifying information was removed, and that they could contact the IRB or investigators with questions.

The task order was designed to separate the three inattentional blindness tasks to decrease the chances that participants would expect an additional object to appear on the second and third inattentional blindness tasks. The order of the three inattentional blindness tasks was randomized for each participant, as was the order of the two span tasks. Given that the items in the matrix reasoning task increased in difficulty across trials and the final trials are challenging for most people, all participants completed it later in the battery (between the second and third inattentional blindness tasks) so that participants would not become discouraged. The task sequence for participants was as follows:

1. Inattentional blindness task 1
2. Span task 1
3. Span task 2
4. Inattentional blindness task 2
5. Matrix reasoning
6. Inattentional blindness task 3
7. Demographic questions

After completing each task, participants pressed a key to continue to the instructions screen for the next task.

Several factors were randomized for each participant that are not of theoretical interest and will not be analyzed. These include the quadrant in which the cross appeared for each trial of the transient inattentional blindness task, whether the additional object moved left to right or right to left in the sustained inattentional blindness task, the location of the search target in the search inattentional blindness task, and the order of the two span tasks. For all the analyses, we combined across the additional objects that were randomly selected for each participant in each inattentional blindness task, but the supplement provides analyses of noticing rates for each object in each task.

The only factor of theoretical interest among the randomly assigned conditions was whether participants in the sustained inattentional blindness task maintained one count of all the attended items (easy counting task) or maintained separate counts of disks and squares (difficult counting task). We might expect a difference in the pattern of individual differences in noticing as a function of this task difficulty manipulation. All data, supplementary materials, and analyses are available at https://osf.io/z2fdu/?view_only=38842af20b8449dc9eefeb156d23912e.

STUDY 2 — METHOD AND PROCEDURES

Study 2 examined whether individual differences in personality measures predicted noticing on the same three inattentional blindness tasks. In total, xx signed up for slots on Prolific and xx completed all of the tasks and were included in analyses. Participants were paid $4 for completing the full study (which typically took xx minutes). **[We will start with a payment amount of $4 for pilot testing of the tasks (pilot data won't be included in the analyses). If the rate of recruiting would mean that we could not reasonably complete the testing within 2 weeks or if the median completion time is longer than anticipated, we will increase the payment amount and will note that here.]** All data were collected between DATE1 and DATE2.

TASKS & DESIGN

In addition to the same three inattentional blindness tasks (and demographic measures) used in Study 1, each participant completed the following personality measures (demo versions available at https://osf.io/z2fdu/?view_only=38842af20b8449dc9eefeb156d23912e).

BFI-2: The BFI-2 is a 60-item scale measuring the Big-5 personality domains (extraversion, agreeableness, conscientiousness, negative emotionality, and open-mindedness) and facets of those domains (mean alpha = 0.87 with a range from alpha = 0.84 to alpha = 0.90; mean test-retest = 0.80 with a range from 0.76 to 0.84; Soto & John, 2017). Each item asks participants to indicate whether they agree or disagree that "I am someone who..." by selecting one of 5 labeled radio buttons (1=Disagree strongly, 2=Disagree a little, 3= Neutral; no opinion, 4=Agree a little, 5=Agree strongly).

MPQ Absorption scale: The absorption scale within the Multidimensional Personality Questionnaire (alpha = 0.88; Patrick, Curtin, & Tellegen, 2002) is related to the Big-5 domain of open-mindedness and measures whether people are open to "absorbing and self-involving sensory and imaginative experiences" (for more information about the MPQ, see https://www.upress.umn.edu/test-division/mpq/). This measure, sometimes known as the Tellegen Absorption Scale, consists of 34 True/False items.

ASRS: The ADHD Self-Report Scale (Kessler et al., 2004) is designed to screen adults for attention-deficit/hyperactivity disorder (omega = 0.92; Stanton et al., 2018). We included the 9 "inattention" items from this scale (we did not use the other 9 items that focused on hyperactivity-impulsivity). For this scale, participants evaluate how frequently they experienced various problems over the previous 6 months by clicking one of 5 labeled radio buttons (Never, Rarely, Sometimes, Often, and Very Often). Items include statements like "How often do you have difficulty keeping your attention when you are doing boring or repetitive work?" This measure has not been used previously in studies of inattentional blindness (see Simons et al., 2024), but we included it as an exploratory measure given that distractibility plausibly could be associated with noticing task-irrelevant objects and events. One small study (Grossman et al., 2015) observed less inattentional blindness with the "monkey business illusion" video (Simons, 2010) among 14 college students with ADHD than among 18 students without ADHD, although the paper did not report controlling for differences in prior familiarity with that or related videos.

FFOCI: We used 30 items from the Five Factor Obsessive-Compulsive Inventory, 10 each for the Fastidiousness, Perfectionism, and Punctiliousness scales (alphas = 0.87, 0.84, and 0.80, respectively; Samuel et al., 2012). These were included to measure various aspects of attention to detail. Each item measures agreement or disagreement with a statement such as "I like my work to be flawless and unblemished" using 5 labeled radio buttons (Strongly Disagree, Disagree, Neither Agree Nor Disagree, Agree, Strongly Agree). Like the ASRS, this measure also has not previously been used to assess individual differences in inattentional blindness. We included it as an exploratory measure because detail orientation is another individual-difference factor commonly suggested to us by members of the general public, and it seems plausible that participants with greater attention to detail might be less likely to notice unexpected objects because they are more intently focused on the primary task.

The tasks sequence again was designed to separate the three inattentional blindness tasks to decrease the chances that participants would deliberately look for an additional object on the second and third tasks. The order of the three inattentional blindness tasks and the order of the four personality measures was randomized, so the sequence for each participant was as follows:

1. Inattentional blindness task 1
2. Personality measure 1
3. Personality measure 2
4. Inattentional blindness task 2
5. Personality measure 3
6. Personality measure 4
7. Inattentional blindness task 3
8. Demographic measures

Finally, given that this study involved survey-style personality measures, we inserted one attention check item in the middle of the BFI-2 ("respond to this item with 'Agree strongly'") and one in the middle of the FFOCI ("respond to this item with 'Disagree strongly'").

RESULTS

ANALYSIS OVERVIEW

We first describe results for analyses of the inattentional blindness measures, including order effects, using data from all participants in both studies. We then describe the coding and analysis of each of the cognitive and personality measures separately and the associations among those measures within each study. Finally, we examine the primary questions for this report: Are individual differences in cognitive measures (study 1) and/or personality measures (study 2) associated with noticing of unexpected objects?

EXCLUSIONS

In each study, we planned to exclude data from any participant who ended their participation before completing all of the tasks because that might indicate a decision to withdraw from the study (excluded participants: n=xx in study 1, n=xx in study 2: [**If no participants were excluded in either study**: "No participants in either study met this exclusion criterion"]). We also planned to exclude data for the sustained inattentional blindness task if participants reported playback problems or glitches while completing it, but we retained data from those participants for other tasks. [**If no participants in either study reported being under 18**: "Prolific automatically excluded participants who were under 18 years of age." **If some participants completed the study and reported being under 18**: "Although Prolific should have excluded participants younger than 18 automatically, data were excluded from xx participants in study xx [and xx participants in study xx] who completed the study and reported being under 18 years."] For study 2, we [excluded | had planned to exclude] survey data (but not inattentional blindness data) from participants who answered both attention-check items incorrectly ([n=xx | , but no participant answered both incorrectly]). Following these exclusions, the analyses for Study 1 included at least partial data for xx participants, and the analyses for Study 2 included at least partial data for xx participants. Other task- or analysis-specific exclusions are described below.

CODING & ANALYSIS: INATTENTIONAL BLINDNESS

For analyses of noticing rates in the inattentional blindness tasks, we combined data across Study 1 and Study 2. We excluded data from participants who reported actively looking for an additional object in addition to performing the primary task on the critical trial (transient: n=xx; sustained-easy: n=xx; sustained-hard: n=xx; search: n=xx). If they suspected that an additional object might appear and searched for it, the critical trial would not measure noticing of an unexpected object.

We treated a person as having noticed on the critical trial if they said "yes" when asked about the presence of an additional object. As a robustness check, we also analyzed the data using a more conservative noticing criterion of saying "yes" to having seen something and also correctly picking the shape they saw when given a forced choice but not requiring a correct forced choice. A liberal criterion counts someone who saw something but was unsure what it was (and guessed wrong) as having seen the unexpected object, whereas a conservative criterion treats that person as inattentionally blind when they actually had seen something. A liberal criterion does risk treating someone who falsely reported having seen an additional object as having noticed, but people tend default to claiming they did not see something when they are uncertain (e.g., see Nartker et al, 2024), so the risk of that sort of misclassification is lower. Although we use the liberal noticing criterion as our primary outcome measure for the inattentional blindness tasks, we report the full analyses using the conservative criterion in the supplement, and we note any discrepancies in the pattern of results in the text.

As a further robustness check, we excluded participants who had poor accuracy on the primary task trials prior to the critical trial. For the transient inattentional blindness task, we computed the proportion of correct line-length judgments prior to the critical trial and excluded data from participants who got fewer than 2 of the 3 judgments correct for this analysis. For the sustained inattentional blindness task, we computed the absolute percentage deviation from the correct count on the last pre-critical trial and excluded data from participants who were more than 20% off in their count. For the search inattentional blindness task, we computed the percentage of pre-critical trials for which participants correctly identified whether the search target was odd or even and excluded data from participants who were less than 80% accurate. In principle, this analysis includes only those participants who we know to have performed adequately on the primary task. We did not apply this exclusion criterion in our primary analysis for two reasons. First, performance on the primary task might be a source of variance tied to the other cognitive and personality measures in the study. Second, even if people perform poorly on the primary task, they might still be adequately engaged in trying to do the task, meaning that the exclusion criterion might remove data from participants that should be included when measuring individual differences.

[**NOTE: We will report any meaningful discrepancies between our primary measure and the robustness checks in the analyses, but we have not flagged every possible place where we might do that. Assume that if we observe a difference in pattern other than an overall shift in average percentage noticing (which would be expected and not interesting) we will add a mention of it in text. The supplement provides the full analyses using each of these robustness checks.**]

Figure 2. *Noticing rates for each task after excluding data from participants who reported searching for an additional object on the critical trial.* **[NOTE: data are placeholders and not real.]**

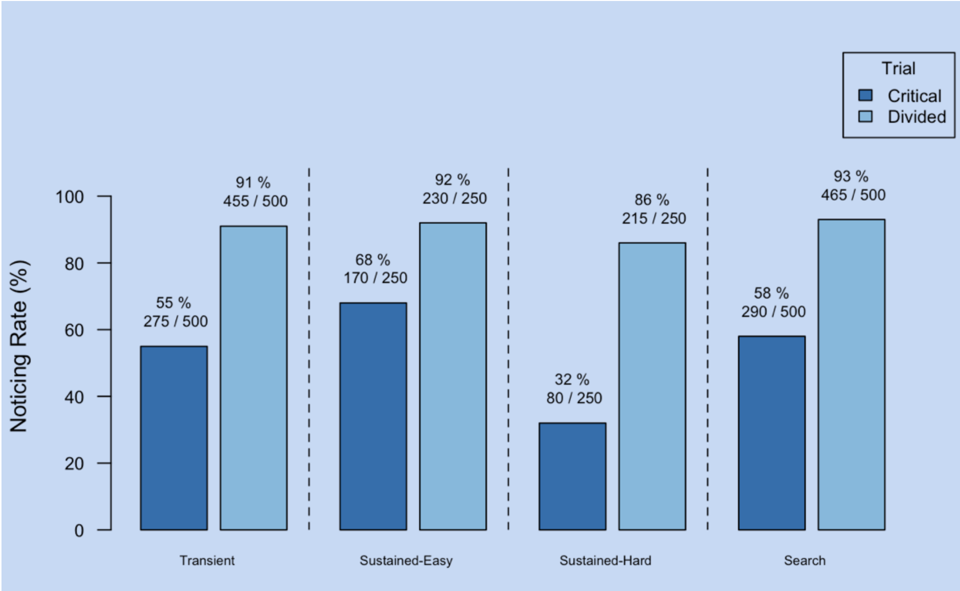


Figure 2 shows the noticing rate for each inattentional blindness task on both the critical trial and the divided attention trial. Overall noticing rates in an inattentional blindness task can vary depending on the primary task demands (e.g., Simons & Chabris, 1999), the distinctiveness of the object itself (e.g., Most et al., 2005), and the similarity of that object to others in the display (e.g., Ding et al., 2023; Goldstein & Beck, 2017; Koivisto & Revonsuo, 2008; Most et al., 2001; Wood & Simons, 2017). To maximize the possibility of measuring associations between noticing and other measures, we chose task parameters that we expected would result in approximately half of the participants noticing. For the sustained task, we targeted an overall noticing rate of 50% when averaging across the easy and hard counting conditions. Overall noticing rates for the three tasks ranged from xx to xx [**if both 30% and 70% are outside the observed range**: “as intended.” **If 30% or 70% are inside the observed range, meaning that noticing/missing in at least one condition was more extreme than desired**: “. The noticing rates were somewhat [higher | lower | higher and lower] in the xx [list the conditions] than we had hoped which might somewhat weaken our ability to observe individual differences.”]

For the sustained task, participants in the difficult counting condition were [more | less | about equally] likely to notice the unexpected object than were participants in the easy counting condition. [**If noticing was higher in the easy than difficulty condition**: “Consistent with prior research examining the effects of primary task difficulty on noticing (e.g., Simons & Chabris, 1999), participants asked to maintain two separate counts were less likely to notice.” **If noticing was NOT higher in the easy than difficult condition**: “Whereas prior studies showed lower noticing percentages with a harder primary task (e.g., Simons & Chabris, 1999), we did not show that pattern. The absence of this effect of task difficulty raises concerns about whether individual difference effects in our study will generalize to other studies using this sort of difficulty manipulation."]

After the critical trial in each inattentional blindness task, participants completed a divided attention trial with the same primary task except that they now knew that they could be asked about an additional object. Noticing rates often are substantially higher on the divided attention trial than on the critical trial [**If noticing on the divided attention trials were consistently greater than for the critical trials**]: ", and we observed that pattern as well. **If noticing rates on any of the divided attention trials were not higher than the corresponding critical trial:** ", but noticing in [all three tasks | name task(s)] unexpectedly was not higher than on the critical trial." [**If there were meaningful differences in the pattern of results for the divided attention trials across tasks, we will describe them here**.] We might expect performance on the divided attention trials to be associated with measures of cognitive ability because it requires participants to devote attention both to the primary task and to looking for an additional object. We examine that question after looking at individual differences in noticing on the critical trial. The supplement provides the noticing rates on the critical and divided attention trials separately for each of the unexpected objects.

Noticing as a function of task order for inattentional blindness tasks

Relatively few studies have examined whether completing an inattentional blindness task and answering questions about an additional object leads participants to expect an additional task-irrelevant object in later tasks in the same study. For our individual difference analyses (below), we excluded participants who reported searching for an additional object on the critical trial, but we can also analyze those exclusions to determine whether using multiple tasks in the same battery is problematic. In the only studies we know of that used two distinct inattentional blindness tasks in the same battery (Horwood & Beanland, 2016; Kreitz et al., 2015), participants largely did not appear to suspect that the second task would have an additional object (unlike our study, these studies did not vary the order of the two tasks within the battery).

Participants should be unlikely to search for an additional object on the first inattentional blindness task they complete because they have no reason to anticipate that one might appear (unless they recognize the task as an inattentional blindness task). Consequently, the noticing rate on the first task provides a baseline to examine the effect of prior tasks on suspicions for later tasks. Averaging across inattentional blindness tasks, an average of xx% (xx/xx) of participants reported actively searching for an additional object on the critical trial on the first task they completed (see the difference between "all" and "exclude" rows in Table 2). Although we cannot be certain that participants actually did search for an additional object, this percentage might represent the proportion of participants who had seen tasks like that one before.

Table 2. *Noticing rates and sample size for each inattentional blindness task both overall and when presented as the first, second, or third inattentional blindness task. "All" corresponds to the noticing rate for all participants who completed the task. "Exclude' removes data from any participants who reported intentionally looking for an additional object on that inattentional blindness task. The difference between all and exclude represents the number of participants who reported actively searching for the unexpected object on the critical trial.*

IB Task	Overall	When 1st	When 2nd	When 3rd
Transient				
all	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)
exclude	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)
Sustained – easy				
all	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)
exclude	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)
Sustained – hard				
all	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)
exclude	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)
Search				
all	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)
exclude	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)
All IB Tasks				
all	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)
exclude	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)	xx% (n=xx)

If prior experience with an inattentional blindness task in the same task battery leads people to expect an additional object on seemingly unrelated tasks, a larger percentage of participants should report searching for an additional object on the second and third inattentional blindness tasks they completed. If completing a prior inattentional blindness task does not raise suspicions about additional objects on later tasks, we should not see a substantial increase in the percentage of participants who reported searching for an additional object on the second and third inattentional blindness tasks.

Combining across the three different inattentional blindness tasks, xx% (xx/xx) of participants reported searching for an additional object on the second inattentional blindness task they completed, and xx% (xx/xx) reported doing so on the third task. Approximately xx% (xx/xx) reported searching on one or both of the second and third tasks. Collectively, these percentages suggest that [**If these percentages are <10% greater than they were for the first task**: "multiple inattentional blindness tasks can be used within the same battery and that the vast majority of participants will not realize that an additional object might appear as long as the tasks seem different enough" **If these percentages are 10-30% more than they were for the first task**: "it is possible to use multiple inattentional blindness tasks in the same battery, but a sizeable minority of participants will be suspicious that subsequent tasks might have additional objects, meaning that they might not measure inattentional blindness for those participants" **If these percentages >30% more than they were for the first task**: "researchers should use caution when using more than one inattentional blindness task in the same battery because a substantial number of participants might actively search for an additional object; for those participants, the later inattentional blindness tasks might not actually measure inattentional blindness"]. We excluded data from our analyses from participants for each inattentional blindness task for which they reported searching for an additional object on the critical trial.

Order effects could result both from anticipation of an additional object on later tasks as well as from more general task order effects (e.g., fatigue or lapsing effort over the course of the task battery). Table 2 shows effects of task order for two metrics. The "all" rows show the overall effect of task order including all participants, even those who reported searching for an additional object on the critical trial. Those order effects might reflect both strategic changes and other task order effects. The "exclude" rows show the effect of task order after excluding data from participants who reported actively searching for an additional object in addition to performing the primary task. Differences as a function of task order in the exclude rows presumably reflect only the contribution of factors like fluctuations in fatigue or effort over the course of the study. Such effects are less important for our purposes because they do not undermine the conclusion that a failure to notice represents inattentional blindness.

Combining across the three different inattentional blindness tasks, we see [little | some | substantial] variation in noticing rates as a function of task order in the "exclude" case [or | , but we see [little | some | substantial] variation] in the "all" case. This pattern suggests that task order effects [are not a concern in this study | resulted primarily from changes in search strategy due to anticipating the appearance of an additional object | resulted primarily from fatigue or other factors that are not specific to anticipating additional objects in later tasks | involved both changes in search strategy due to anticipating the appearance of an additional object and fatigue or other factors that are not specific to anticipating additional objects in later tasks]. For our primary analyses, we will average across task presentation order after excluding data from participants who reported searching for an additional object on the critical trial of a task (See Figure 2).

Is noticing on one inattentional blindness task related to noticing on another?

The use of multiple inattentional blindness tasks in the same battery also allows us to evaluate whether participants who noticed the additional object in one task were more likely to notice additional objects in other tasks. Such studies have observed weak associations between noticing on a transient and a sustained inattentional blindness task in the same battery. For example, Horwood and Beanland (2016) reported $r(80) = -0.07$ for younger participants and $r(78) = 0.20$ for older participants (who had especially low noticing rates in one of the tasks) and Kreitz et al. (2015) reported an overall correlation of $r(172)=0.13$, but smaller correlations when comparing more when the associations included only directly comparable conditions. These relatively weak associations, especially when task conditions were matched, raise doubts about the existence of an underlying trait or ability to notice or detect unexpected objects that influences performance across different types of inattentional blindness tasks.

Table 3. *Correlations (Phi coefficient) for noticing in the three inattentional blindness tasks, separated for participants completing the easy and hard counting versions of the sustained inattentional blindness task. The data in each cell exclude participants who reported anticipating the presence of an additional object on either of those two tasks.*

	Transient	Sustained – easy	Search
Transient	--		
Sustained – easy	r(n) = xx	--	
Search	r(n) = xx	r(n) = xx	--

	Transient	Sustained – hard	Search
Transient	--		
Sustained – hard	r(n) = xx	--	
Search	r(n) = xx	r(n) = xx	--

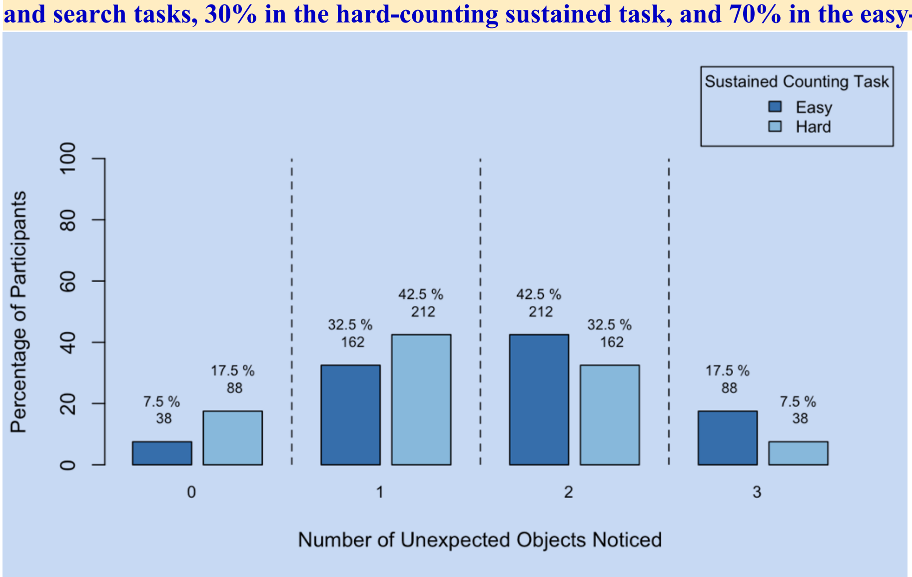
We first examined the correlations between the inattentional blindness tasks to determine whether noticing on one task was associated with noticing on another (see Table 3). We computed these correlations separately for the participants in the easy and hard counting conditions of the sustained inattentional blindness task because we anticipated a difference in the overall noticing rates for those conditions. The largest correlation between these three tasks was r=xx, with a range of r=xx to r=xx and an average of r=xx (calculated using Fisher's Z transformation and then converting back to r). [**If these correlations are all < r = 0.15**: "The lack of substantial correlations between tasks is consistent with evidence (Kreitz et al., 2015) and with the idea that noticing might be a largely stochastic process on each trial and not a stable individual difference (Simons & Jensen, 2009)."]

We also calculated alpha to assess the overall interrelations among these inattentional blindness tasks for those participants who did not report searching for an additional object on any of the critical trials (easy counting: alpha = xx, n=xx; hard counting: alpha = xx, n=xx). [**If either n < 100:** Given that many participants reported looking for an additional object on the critical trial of one or more of the inattentional blindness tasks, aggregating across tasks would not provide enough data to reliably estimate associations with other measures, so we will consider each inattentional blindness task separately (The supplement includes associations between the other measures and the total number of unexpected objects noticed across the three tasks even though the sample sizes are small). **If both ns > 100, both alpha values are ≥0.50, and the average correlation across measures is ≥ r = 0.2:** "Noticing on the three inattentional blindness tasks appears to be somewhat related, suggesting that noticing might represent a stable individual difference factor. For that reason, we computed a sum score for the total number of unexpected objects these participants noticed (possible range: 0-3). We will use this sum score in addition to noticing on the individual tasks to evaluate associations with the cognitive and personality measures. Figure 3 shows the distribution of these sum scores." **If both ns>100 and either alpha < 0.50 or the average correlation across measures is < r = 0.2 (or both)**: "Noticing on the three inattentional blindness tasks does not appear to be closely related, so we will treat these tasks as if they do not tap a single underlying "noticing" construct and will examine individual differences for each of them separately. The supplement includes associations between the other measures and the total number of unexpected objects noticed across the three tasks."]

[NOTE: In the remainder of the stage-1 manuscript, we have included prose and placeholders for the results with the aggregated measure. If the correlations or alpha levels are too low to justify aggregating, we will remove the results for the aggregated measure from the main text, but we still will report them fully in the supplement. Removing the text and placeholders also will require renumbering of tables/figures for the stage 2 manuscript. We have attempted to make the results for this aggregated measure self-contained in the manuscript in order to make clear what would be removed.]

[If the alpha levels and correlations were high enough to use the sum score as a primary outcome measure, this figure will be included in the main text. Otherwise, it will be in the supplement.]

Figure 3. *Distribution of the total number of unexpected objects noticed (across the three tasks) for those participants who did not actively search for an unexpected object on any of the critical trials. Distributions are reported separately for the easy and hard counting conditions of the sustained inattentional blindness task because we anticipated a difference in the overall noticing rates for those conditions.* **[Note: Values are placeholders for illustration purposes only and not actual data. The values used in this sample figure assumed no relationship between noticing on one task and noticing on another and the following noticing rates: 50% in the transient and search tasks, 30% in the hard-counting sustained task, and 70% in the easy-counting sustained task.]**

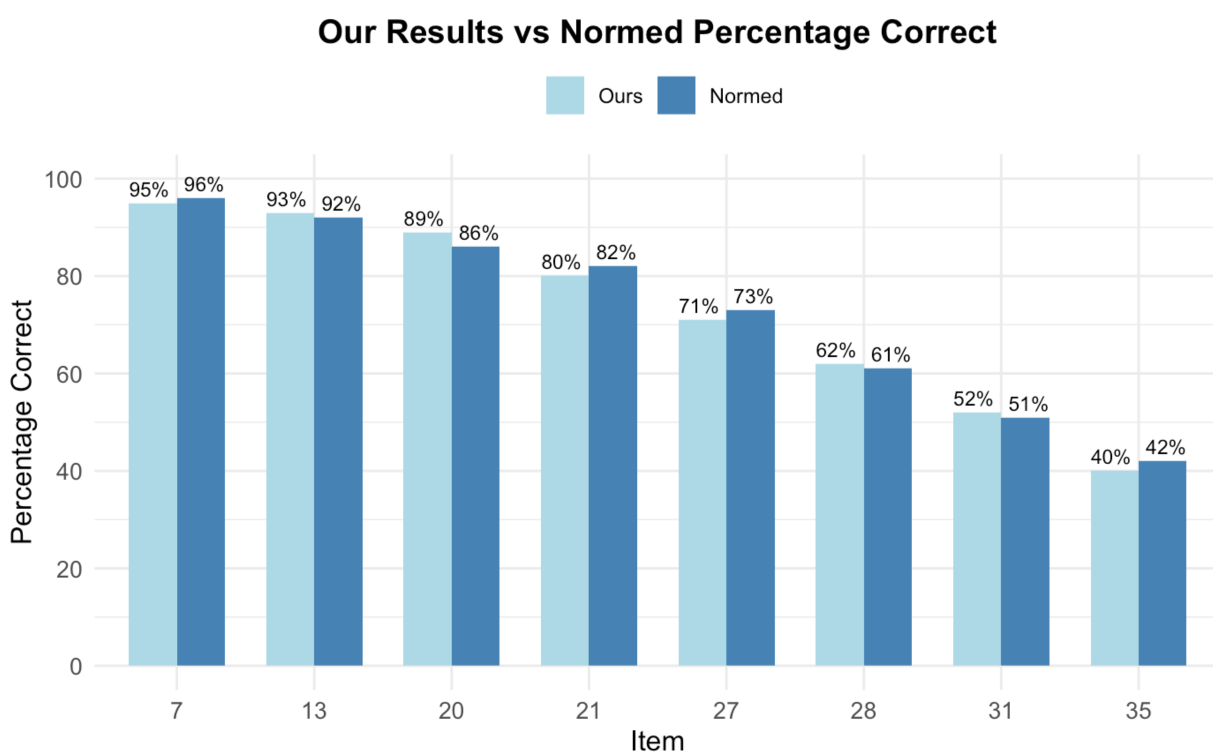


CODING & ANALYSIS: COGNITIVE MEASURES (STUDY 1)

TestMyBrain Matrices

The primary score on this task is the total number of correct responses out of the 8 reasoning problems. We excluded data from participants who were not attempting to complete the problems. Specifically, we excluded data from any participants who selected the same response option for all 8 items or who took less than 2 seconds on average to complete each of the 8 items (i.e., just picking an answer without trying for each of the problems). We also excluded data from participants who reported technical problems while completing this task. The distribution of total scores for the n=xx participants included in the analyses is shown in Figure 4 (M=xx, median=xx, SD=xx). The items were chosen to increase in difficulty according to the norms reported by TestMyBrain (Personal Correspondence, Jeremy Wilmer, January 2024). The percentage correct for the individual items [aligned with | mostly aligned with | differed somewhat from | differed from] the item norms [if needed, add a brief description of how the patterns diverged] (Figure 4).

Figure 4. Percentage correctly answering each matrix problem along with the normed percentages reported by TestMyBrain. Note that the figure below is intended as an example and **does not include real data**. It is only a mock-up of what the figure might look like. We may adjust the appearance of the figure. It is intended only as an illustration.



Span tasks

Our primary measure for both OSpan and Rotation Span is the *Absolute Score* after excluding participants with less than 85% accuracy on the non-memory questions (e.g., the math problems for OSpan). The *Absolute Score* is the sum of the correctly recalled items across all trials for which the sequence was recalled perfectly, with no credit given for partially recalled sequences or items recalled out of sequence. For example, for OSpan, if a person correctly recalled all three letters on a length-3 trial, all four letters on a length-4 trial, and 2 letters on a length-5 trial, their score would be 7 (3 + 4 + 0).

As a secondary measure, we also calculated the *Total Score* using the same 85% accuracy criterion. The Total Score counts any correctly reported items without requiring participants to correctly report all items on that trial. So, for the same example, the total score would be 9 (3 + 4 + 2).

Table 4. *Descriptive statistics for span tasks.*

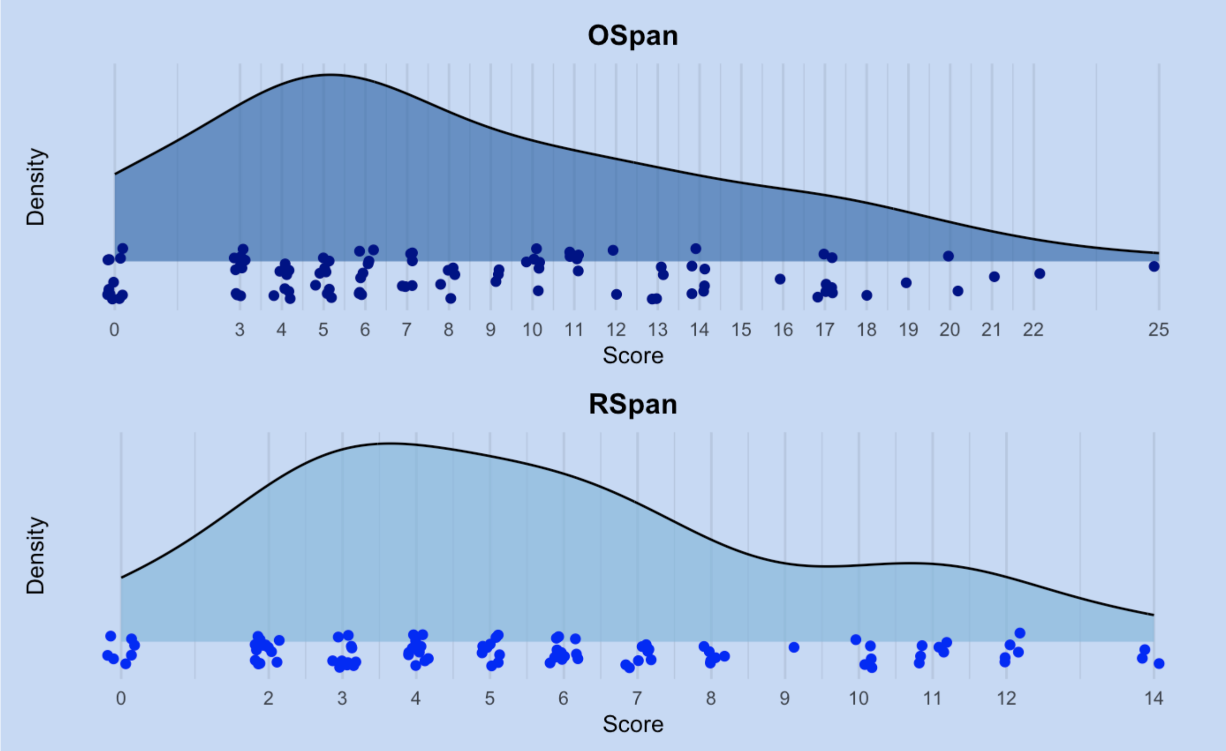
Measure	N	Mean(SD) Error rate	N ≥ 85% accuracy	Mean(SD) Absolute Score	Mean(SD) Total Score	Correlation between Absolute Scores and Total Scores
OSpan						
Rotation Span						

Note: Absolute and total score exclude participants with lower than 85% accuracy on the non-memory task, but error rate includes all participants.

Table 4 shows descriptive statistics for OSpan and Rotation Span along with the correlation between total scores and absolute scores. Figure 5 shows the distributions of absolute scores across participants. [**If the distributions of Absolute Scores and Total Scores are similar and correlated ≥ 0.8 for both span tasks:** "Given that the Absolute and Total Scores were highly correlated, when analyzing the relationship between the span tasks and other measures, we report only the Absolute Scores in the text (with Total Scores reported in the supplement)." **If either span task shows radically different distributions for Absolute and Total Scores or shows correlations <0.8 between those scores:** "Given that Absolute and Total Scores [were not highly correlated [and had different distributions]] we report both measures when analyzing the relationship between the span tasks and other measures."]

The Appendix describes the associations among these cognitive measures and examines whether our data showed the patterns we would expect given prior evidence in the literature.

Figure 5. Distribution of absolute scores for OSpan and Rotation Span. For OSPAN, given that the task included set sizes 3-7, the minimum possible absolute score is 0 and the maximum is 25, with scores of 1, 2, 23, and 24 not possible. For RSpan, given the included set sizes 2-5, the scores range from 0 to 14, but scores of 1 and 14 are not possible. **[Note that the figure below is intended as an example and does not include real data. We may adjust the appearance of the figure. It is intended only as an illustration.]**



CODING & ANALYSIS: PERSONALITY MEASURES (STUDY 2)

Our primary measure for the BFI-2, the MPQ Absorption scales, the ASRS inattention subscale, and the FFOCI Fastidiousness, Perfectionism, and Punctiliousness scales are sum scores after appropriate reverse scoring. Table 5 shows descriptive statistics and reliability for each measure. (See the supplement for distributions of scores on each measure and for descriptive statistics for each facet subscore of the BFI-2. **[The supplement will be created at Stage 2.]**). The Appendix describes the associations among these personality measures and tests whether our data show the patterns we might expect given prior evidence in the literature.

Table 5. *Descriptive statistics for each personality measure.*

Measure	**N**	**Observed alpha / omega**	**Possible Range**	**Mean**	**Median**	**SD**
Extraversion						
Agreeableness						
Conscientiousness						
Negative emotionality						
Open-mindedness						
MPQ-Absorption						
ASRS-Inattention						
FFOCI-Fastidiousness						
FFOCI-Perfectionism						
FFOCI-Punctiliousness						

PREDICTING INATTENTIONAL BLINDNESS

The primary question of interest in this manuscript is whether individual differences in measures of cognitive ability or personality are associated with noticing of unexpected objects.

[If using the aggregate noticing measure, include the following paragraph]:

We first used ordinal regression with the aggregate noticing score as the dependent variable and each cognitive and personality measure separately as a predictor variable (see Tables 8 and 9). Given that the number of unexpected objects noticed is discrete (not binning of an underlying continuous latent measure) and that each outcome can only occur after having noticed the prior number of outcomes (e.g., you can't notice 3 unexpected objects before noticing 2), we used a sequential model with a probit link function (see Bürkner & Vuorre, 2019 for a discussion of this family of models). All models were computed using R and the brms package (Bürkner, 2017).

[If using the aggregate noticing measure, include the following Table in the main text]

Table 6. *Means for each measure as a function of the number of unexpected objects detected across the transient, sustained-easy, and search inattentional blindness tasks, along with the coefficient from an ordinal regression predicting the aggregate noticing measure from each individual difference measure (and its 95% highest density*

interval). Each individual differences measure was Z-scored prior to conducting the ordinal regression to make the coefficients directly comparable across measures.

Measure	Noticed 0 Mean [95% CI], n	Noticed 1 Mean [95% CI], n	Noticed 2 Mean [95% CI], n	Noticed 3 Mean [95% CI], n	Coefficient [HDI]
TestMyBrain Matrices					
OSpan					
Rotation Span					
Extraversion					
Agreeableness					
Conscientiousness					
Negative emotionality					
Open-mindedness					
MPQ Absorption					
ASRS Inattention					
FFOCI Fastidiousness					
FFOCI Perfectionism					
FFOCI Punctiliousness					

[If using the aggregate noticing measure, include the following Table in the main text]

Table 7. *Means for each measure as a function of the number of unexpected objects detected across the transient, sustained-hard, and search inattentional blindness tasks, along with the coefficient from an ordinal regression predicting the aggregate noticing measure from each individual difference measure (and its 95% highest density interval). Each individual differences measure was Z-scored prior to conducting the ordinal regression to make the coefficients directly comparable across measures.*

Measure	Noticed 0 Mean [95% CI], n	Noticed 1 Mean [95% CI], n	Noticed 2 Mean [95% CI], n	Noticed 3 Mean [95% CI], n	Coefficient [HDI]
TestMyBrain Matrices					
OSpan					
Rotation Span					
Extraversion					
Agreeableness					
Conscientiousness					
Negative emotionality					
Open-mindedness					
MPQ Absorption					
ASRS Inattention					
FFOCI Fastidiousness					
FFOCI Perfectionism					
FFOCI Punctiliousness					

[If using the aggregate noticing measure, include the following paragraph.]

Interpreting the value of the regression coefficient from an ordinal regression is not intuitive, but we can examine whether the highest density intervals include 0 as a way of assessing whether scores on a measure systematically increased or decreased as a function of greater noticing scores. If participants who score higher on a measure are more likely to notice, the coefficient should be positive and the highest density interval should exceed 0. If higher scores on a measure are associated with less noticing, then the coefficient should be negative. Across all of the measures, the average absolute magnitude of the coefficients was xx, with [# | none] yielding a regression coefficient whose highest density interval excluded zero. **[Discuss any measures that produced a coefficient that did not include zero and note whether that same measure consistently predicted noticing across both groups of participants (easy and hard counting).]**

[**If using the aggregate noticing measure**: "Next we"; **Otherwise:** "We"] examined whether the cognitive and personality measures were associated with noticing on each inattentional blindness task separately. Tables 8 and 9 show the scores on the primary outcome for each measure separated based on whether participants noticed or missed the unexpected object in each inattentional blindness task.

[**If none of the cognitive or personality measures shows an r > 0.10 with noticing on the critical trial: "**None of the cognitive or personality measures showed a sizable (r > 0.10) association with noticing, suggesting that individual differences, at least as measured by these tasks, are not associated with the detection of unexpected objects, regardless of the type of inattentional blindness task or the difficulty of the primary task."]

[**If none of the cognitive measures show an r > 0.10 with noticing on the critical trial (but some personality measures do):** "None of the cognitive measures showed a sizable (r > 0.10) association with noticing, suggesting that these individual differences in cognitive ability, at least as measured by these tasks, do not predict the detection of unexpected objects, regardless of the type of inattentional blindness task or the difficulty of the primary task." **For any personality measures showing r>0.10, discuss the observed effect size and whether there are meaningful differences or consistency in that effect across the IB tasks.**]

[**If none of the personality measures show an r > 0.10 with noticing on the critical trial (but some cognitive measures do):** "None of the personality measures showed a sizable (r > 0.10) association with noticing, suggesting that individual differences in personality do not predict the detection of unexpected objects, regardless of the type of inattentional blindness task or the difficulty of the primary task." **For any cognitive measures showing r>0.10, discuss the observed effect size and whether there are meaningful differences or consistency in that effect across the IB tasks.**]

[**If some cognitive and some personality measures show r > 0.10 with noticing on the critical trial, discuss the observed effect sizes and whether there are meaningful differences or consistency in that effect across the IB tasks.**]

[If any data were excluded due to the attention checks in the survey items, include the following paragraph]
Recall that we excluded data from participants in Study 2 who answered both attention check items incorrectly. Given that performance on those attention check items might be associated with individual differences in ADHD, as a robustness check, we examined whether including those participants would affect the association between the ASRS inattention scale and noticing. The strength of the association with noticing was [about the same | weaker | stronger **where about the same is within ±0.10**] when including those additional participants (transient: r=xx; sustained-easy: r=xx; sustained-hard: r=xx; search: r=xx).

Table 8. *Descriptive statistics for noticers and missers on each inattentional blindness task for the primary outcome of each cognitive individual difference measure. The final column reports the point-biserial correlation between noticing and that measure along with a 95% confidence interval and the associated p-value.*

IB task	Measure	Notice M(SD) n/total	Miss M(SD) n/total	r(n), [95% CI], p
Transient	TestMyBrain Matrices			
	OSpan			
	Rotation Span			
	Cross-task accuracy (pre-critical trials)			
Sustained (easy)	TestMyBrain Matrices			
	OSpan			
	Rotation Span			
	Counting-task accuracy (last pre-critical trial)			
Sustained (difficult)	TestMyBrain Matrices			
	OSpan			
	Rotation Span			
	Counting-task accuracy (last pre-			

IB task	Measure	Notice M(SD) n/total	Miss M(SD) n/total	r(n), [95% CI], p
	critical trial)			
Search	TestMyBrain Matrices			
	OSpan			
	Rotation Span			
	Target identification accuracy (across pre-critical trials)			

Table 9. *Descriptive statistics and t-tests comparing noticers to missers on each inattentional blindness task for the primary outcome of each personality individual difference measure (Study 2). The final column reports the point-biserial correlation between noticing and that measure along with a 95% confidence interval and the associated p-value.*

IB task	Measure	Notice M(SD) n/total	Miss M(SD) n/total	r(n), [95% CI], p
Transient	Extraversion			
	Agreeableness			
	Conscientiousness			
	Negative emotionality			
	Open-mindedness			
	Absorption			
	ASRS Inattention			
	FFOCI Fastidiousness			
	FFOCI Perfectionism			
	FFOCI Punctiliousness			
Sustained (easy)	Extraversion			
	Agreeableness			
	Conscientiousness			

IB task	Measure	Notice M(SD) n/total	Miss M(SD) n/total	r(n), [95% CI], p
	Negative emotionality			
	Open-mindedness			
	Absorption			
	ASRS Inattention			
	FFOCI Fastidiousness			
	FFOCI Perfectionism			
	FFOCI Punctiliousness			
Sustained (difficult)	Extraversion			
	Agreeableness			
	Conscientiousness			
	Negative emotionality			
	Open-mindedness			
	Absorption			
	ASRS Inattention			
	FFOCI Fastidiousness			
	FFOCI Perfectionism			
	FFOCI Punctiliousness			
Search	Extraversion			
	Agreeableness			
	Conscientiousness			
	Negative emotionality			
	Open-mindedness			
	Absorption			
	ASRS Inattention			

IB task	Measure	Notice M(SD) n/total	Miss M(SD) n/total	r(n), [95% CI], p
	FFOCI Fastidiousness			
	FFOCI Perfectionism			
	FFOCI Punctiliousness			

To determine whether all of the cognitive measures in Study 1, taken together, can account for who does and does not notice unexpected objects in an inattentional blindness task, we conducted four separate logistic regression analyses with noticing (yes/no) as the dependent. For the transient inattentional blindness task, this analysis yielded R^2 = xx, p=xx (the reported pseudo R^2 is Tjur's coefficient of determination; Tjur, 2009). For the sustained inattentional blindness task with an easy counting task, this analysis yielded R^2 = xx, p=xx. For the sustained inattentional blindness task with the difficult counting task, this analysis yielded R^2 = xx, p=xx. For the search inattentional blindness task, this analysis yielded R^2 = xx, p=xx.

We similarly predicted noticing from all 8 personality measures in Study 2. For the transient inattentional blindness task, this analysis yielded R^2 = xx, p=xx. For the sustained inattentional blindness task with the easy counting task, this analysis yielded R^2 = xx, p=xx. For the sustained inattentional blindness task with the difficult counting task, this analysis yielded R^2 = xx, p=xx. For the search inattentional blindness task, this analysis yielded R^2 = xx, p=xx

[We will add a paragraph here summarizing any evidence that cognitive or personality measures, either individually or collectively, predict noticing on the three inattentional blindness tasks.]

Finally, we examined whether individual differences on the cognitive measures were associated with noticing on the divided attention trial of each task (Table 10). We might expect stronger associations between cognitive ability measures on the divided attention trial than on the critical trial because participants presumably are devoting some attention to searching for an additional object while still performing the primary task.

Table 10. *Descriptive statistics for noticers and missers on the divided attention trial of each inattentional blindness task for the primary outcome of each cognitive individual difference measure. The final column reports the point-biserial correlation between noticing on the divided attention trial and that measure along with a 95% confidence interval and the associated p-value.*

IB task	Measure	Notice (divided attention trial) M(SD) n/total	Miss (divided attention trial) M(SD) n/total	r(n), [95% CI], p
Transient	TestMyBrain Matrices			
	OSpan			
	Rotation Span			
	Cross-task accuracy (pre-critical trials)			
Sustained (easy)	TestMyBrain Matrices			
	OSpan			
	Rotation Span			
	Counting-task accuracy (last pre-critical trial)			
Sustained (difficult)	TestMyBrain Matrices			
	OSpan			
	Rotation Span			
	Counting-task accuracy (last pre-critical trial)			
Search	TestMyBrain Matrices			
	OSpan			
	Rotation Span			
	Target identification accuracy (across			

IB task	Measure	Notice (divided attention trial) M(SD) n/total	Miss (divided attention trial) M(SD) n/total	r(n), [95% CI], p
	pre-critical trials)			

[**If none of the cognitive measures shows an r > 0.10 with noticing on the divided attention trial: "**None of the cognitive measures showed a sizable (r > 0.10) association with noticing on the divided attention trial, suggesting that such individual differences are unrelated to noticing even when participants might be looking for an additional object. The lack of any associations here is somewhat surprising given that span tasks and fluid intelligence tasks are linked to attentional control."]

[**If any of the cognitive measures show an r > 0.10 with noticing on the divided attention trial, discuss the observed effect sizes and whether there are meaningful differences or consistency in that effect across the IB tasks.**]

USING INDIVIDUAL SURVEY ITEMS TO PREDICT NOTICING

We conducted an exploratory analysis to test whether any of the individual items on the personality measure could be used to predict noticing in the inattentional blindness tasks. For each personality item, we used k-fold cross-validation to examine the association between scores on that item and noticing, separately for the transient inattentional blindness task, the sustained inattentional blindness task with an easy counting task, the sustained inattentional blindness task with a difficult counting task, and the search inattentional blindness task. We also computed a loo-adjusted R2 estimate (using the brms R package) for each inattentional blindness outcome measure to determine how much variance all of the items can explain. These analyses excluded data from participants who reported expecting an additional object on any of the inattentional blindness tasks and then combined across the order of the inattentional blindness tasks. **[If this exploratory analysis reveals any items that predict noticing consistently, we will examine those items to determine if they appear to form coherent constructs. If they do, we will use this analysis to form a new measure that could be tested in future studies to determine whether it predicts noticing.]**

GENERAL DISCUSSION

[We will add a general discussion section that summarizes the observed results and places them into the context of other evidence for (and against) individual differences in the prediction of noticing. The section will include a "constraints on generality" statement (Simons et al., 2017).]

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ACKNOWLEDGMENTS

Thanks to Jeremy Wilmer for providing the TestMyBrain Matrices task materials and norms and for his guidance on the best version to use for this study. Thanks also to Fred Oswald, Tom Redick, and Zach Hambrick for their guidance on the use of SPAN tasks. Thanks to Bo Zhang for helpful discussion of the analysis of aggregated data. This research will be supported by the Center for Open Science and Templeton Foundation "Consciousness Research with Registered Reports" program.

APPENDIX

TESTING EXPECTED ASSOCIATIONS AMONG COGNITIVE MEASURES

We examined some associations that we should expect to find based on previous individual differences research. Table A1 shows the associations among the cognitive predictors in Study 1.

Table A1. *Correlation matrix among the cognitive predictor measures, along with the sample size contributing to each correlation. Note: The two counting accuracy measures refer to performance on the last pre-critical trial of the sustained inattentional blindness task.*

	Matrix Reasoning	OSpan	Rotation Span	Easy counting accuracy	Difficult counting accuracy
Matrix Reasoning	-				
OSpan	r(n) = xx	-			
Rotation Span	r(n) = xx	r(n) = xx	-		
Easy counting accuracy	r(n) = xx	r(n) = xx	r(n) = xx	-	
Difficult counting accuracy	r(n) = xx	r(n) = xx	r(n) = xx	-	-

First, we expect that measures of deliberate attention and memory should be associated with each other and with measures of fluid intelligence. Performance on OSpan and Rotation Span tends to be correlated, [and | but] we [did | did not] observe this correlation (r=xx). OSpan has also been shown to correlate with measures of fluid intelligence, including the WAIS-IV Matrices task, which was the model for the TestMyBrain matrix reasoning task we used (see Passell et al., 2019). We [observed | did not observe] this expected correlation between OSpan and the TestMyBrain matrix reasoning task in our sample (r=xx). Performance on the Rotation Span task was [positively | negatively | weakly | not] correlated with performance on the TestMyBrain matrix reasoning task.

Given that measures of fluid intelligence and attentional control both would be expected to predict performance on sustained, deliberate attention tasks, we might expect them to predict tracking performance on the final pre-critical trial of the sustained inattentional blindness task. [Consistent | Inconsistent] with this expected pattern, **[here we will describe the pattern for different predictors for the easy and difficult counting tasks]**.

Given that the counting task in the sustained inattentional blindness task is a deliberate attentional control task, counting accuracy should be associated with performance on OSpan and Rotation Span (e.g., see Bredemeier & Simons, 2012). [Consistent | Partially consistent | Inconsistent] with that prediction, we observed a correlation of r=xx for OSpan and r=xx for Rotation Span in the easy counting condition. We might expect stronger associations for the more difficult counting condition, [and we did | but we did not], with a correlation of r=xx for OSpan and r=xx for Rotation Span.

TESTING EXPECTED ASSOCIATIONS AMONG PERSONALITY MEASURES

Table A2 shows the associations among the personality measures. The MPQ-Absorption score and the BFI-2 Open Mindedness overlap in the constructs they measure (McCrae, 1993), so we expected [and found | but did not observe] a sizable positive correlation (r=xx). Based on an internet sample used in the development and validation of the BFI-2 (Soto & John, 2017), we would expect the pattern of associations indicated as the normative associations in Table 7 (in orange). In general, the pattern we observed [matched | differed from] those normative results. **[We will describe differences in the Big-5 correlations here.]**

Table A2. *Correlation matrix among the personality predictor measures, along with the sample size contributing to each correlation.*

	Extraversion	Agreeableness	Conscientiousness	Negative emotionality	Open-mindedness	MPQ	ASRS Inattention	FFOCI Fastidiousness	FFOCI Perfectionism	FFOCI Punctiliousness
Extraversion	-									
Agreeableness	r(n) = xx r = .14	-								
Conscientiousness	r(n) = xx r = .22	r(n) = xx r = .28	-							
Negative emotionality	r(n) = xx r = -.34	r(n) = xx r = -.29	r(n) = xx r = -.30	-						
Open-mindedness	r(n) = xx r = .20	r(n) = xx r = .15	r(n) = xx r = -.02	r(n) = xx r = -.06	-					
MPQ Absorption	r(n) = xx	r(n) = xx	r(n) = xx	r(n) = xx	r(n) = xx	-				
ASRS Inattention	r(n) = xx	r(n) = xx	r(n) = xx	r(n) = xx	r(n) = xx	r(n) = xx	-			
FFOCI Fastidiousness	r(n) = xx r = .15	r(n) = xx r = .07	r(n) = xx r = .66	r(n) = xx r = .-.18	r(n) = xx r = .15	r(n) = xx	r(n) = xx	-		
FFOCI Perfectionism	r(n) = xx r = .22	r(n) = xx r = .12	r(n) = xx r = .53	r(n) = xx r = -.12	r(n) = xx r = .17	r(n) = xx	r(n) = xx	r(n) = xx r = .78	-	
FFOCI Punctiliousness	r(n) = xx r = .21	r(n) = xx r = .29	r(n) = xx r = .56	r(n) = xx r = -.21	r(n) = xx r = .02	r(n) = xx	r(n) = xx	r(n) = xx r = .61	r(n) = xx r = .65	-

Note: Results from a 1000-person internet validation sample for the BFI-2 (Soto & John, 2017) are shown in orange for the Big-5 domains. Associations of the FFOCI scales with each other and with the BFI-2 are from Hiles, Bonner, Davis & Roberts (unpublished 2024).

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Study Design Table

Please see the notes on the page after the abstract. Our approach to writing the stage 1 manuscript shows exactly how we will analyze the data and includes placeholders for the analysis outcomes and the prose we use to interpret different outcomes. That approach eliminates any ambiguity about the analysis plan and how we will evaluate the key questions. The main questions addressed by this research are listed on page 9. The sampling plan and sample size justification (rationale for sensitivity) appear on pages 10-11. Additional details about the stopping rule for each study are on 13 and 19. In all cases, the primary alternative hypotheses are: (a) individual differences can predict who will notice and who will not, or (b) individual differences do not appear to predict who will notice and who will not.

Question	Hypothesis	Sampling plan	Analysis plan	Rationale for sensitivity	Interpretation given for different outcomes	Theory that could be shown wrong by the outcomes
1. Are people who notice an unexpected object in one inattentional blindness task more likely to notice an unexpected object in a different sort of inattentional blindness task?	(a) if noticing is not a stable individual difference, then noticing on the two tasks will be unrelated. (b) if noticing is a stable individual difference, then noticing on one task might be correlated with noticing on a second task.	See pages 10-11.	See analysis description on pages 21-27 with contingent interpretations for different analysis outcomes.	See pages 10-11.	See analysis description on pages 21-27 with contingent interpretations for different analysis outcomes.	See Hypotheses for different outcomes that can be supported or rejected and see the analysis for contingent language describing different outcomes.
2. Is noticing of unexpected objects associated with individual differences in performance on cognitive ability measures (matrix reasoning task, OSpan, Rotation Span)	(a) individual differences can predict who will notice and who will not, or (b) individual differences do not appear to predict who will notice and who will not.	See pages 10-11.	See analysis in Table 8 and description on pages 31-34 with contingent interpretations for different analysis outcomes.	See pages 10-11.	See analysis in Table 8 and description on pages 31-34 with contingent interpretations for different analysis outcomes.	See Hypotheses for different outcomes that can be supported or rejected and see the analysis for contingent language describing different outcomes.
3. Is noticing of unexpected objects associated with individual differences in measures of personality?	(a) individual differences can predict who will notice and who will not, or (b) individual differences do not appear to predict who will notice and who will not.	See pages 10-11.	See description on pages 31-33 with contingent interpretations for different analysis outcomes and Table 9 on pages 35-36	See pages 10-11.	See description on pages 31-33 with contingent interpretations for different analysis outcomes and Table 9 on pages 35-36	See Hypotheses for different outcomes that can be supported or rejected and see the analysis for contingent language describing different outcomes.
4. Can all of the cognitive ability measures collectively predict noticing of unexpected objects?	(a) individual differences can predict who will notice and who will not, or (b) individual differences do	See pages 10-11.	See analysis description on pages 36-37 with contingent interpretations for different	See pages 10-11.	See analysis description on pages 36-37 with contingent interpretations for different	See Hypotheses for different outcomes that can be supported or rejected and see the analysis for contingent

	not appear to predict who will notice and who will not.		analysis outcomes.		analysis outcomes.	language describing different outcomes.
5. Can all of the personality measures collectively predict noticing of unexpected objects?	(a) individual differences can predict who will notice and who will not, or (b) individual differences do not appear to predict who will notice and who will not.	See pages 10-11.	See analysis description on pages 37 with contingent interpretations for different analysis outcomes.	See pages 10-11.	See analysis description on pages 37 with contingent interpretations for different analysis outcomes.	See Hypotheses for different outcomes that can be supported or rejected and see the analysis for contingent language describing different outcomes.
6. Are individual differences more predictive of noticing for some inattentional blindness tasks than others, and do the same individual differences predict noticing across tasks?	(a) individual differences can predict who will notice and who will not, or (b) individual differences do not appear to predict who will notice and who will not.	See pages 10-11.	See analysis description on pages 31-36 with contingent interpretations for different analysis outcomes.	See pages 10-11.	See analysis description on pages 31-36 with contingent interpretations for different analysis outcomes.	See Hypotheses for different outcomes that can be supported or rejected and see the analysis for contingent language describing different outcomes.
7. Are individual differences in cognitive measures associated with noticing on the divided attention trials of the inattentional blindness tasks.	(a) individual differences can predict who will notice and who will not, or (b) individual differences do not appear to predict who will notice and who will not.	See pages 10-11.	See analysis description on pages 37-39 with contingent interpretations for different analysis outcomes.	See pages 10-11.	See analysis description on pages 37-39 with contingent interpretations for different analysis outcomes.	See Hypotheses for different outcomes that can be supported or rejected and see the analysis for contingent language describing different outcomes.
8. Can individual items from the personality measures be combined to create a new scale that distinguishes people who do and do not notice unexpected objects?	Exploratory	See pages 10-11.	See pages 37		See pages 37	NA

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