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Who should be searching? Differences in personality can affect visual search accuracy☆

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ABSTRACT

Visual search is an everyday task conducted in a wide variety of contexts. Some searches are mundane, such as finding a beverage in the refrigerator, and some have life-or-death consequences, such as finding improvised explosives at a security checkpoint or within a combat zone. Prior work has shown numerous influences on search, including "bottom-up" (physical stimulus attributes) and "top-down" factors (task-relevant or goal-driven aspects). Recent work has begun to focus on "observer-specific" factors, examining how searchers' attributes might influence search performance. A logical extension involves exploring whether some individuals are better suited to conduct visual searches than other individuals. The current study examined whether certain personality characteristics relate to visual search performance in a large sample of professional searchers employed by the U.S. Transportation Security Administration. Of the "big five" personality traits (neuroticism, extroversion, openness, agreeableness, and conscientiousness), only conscientiousness significantly correlated with visual search accuracy. Both early-career and experienced professional searchers demonstrated a significant relationship between conscientiousness scores and accuracy on a simple visual search task. These findings validate the notion that searchers' attributes impact their visual search performance and suggest that personality assessments might prove useful for hiring and selection decisions regarding professional tasks that incorporate visual search.

1. Introduction

Visual search—the act of finding targets among distractors—is a commonplace activity with people conducting visual searches in everyday situations, such as finding a beverage in the refrigerator, and in highly dangerous scenarios, such as finding improvised explosive devices (IEDs) in combat zones. Visual search is nearly a ubiquitous activity, which makes it an interesting and important topic to study. Given the impact of visual search upon many aspects of everyday life, and some life-or-death situations, it is vital to identify which factors might influence performance. There have been decades of research into the nature of visual search (Eckstein, 2011; Nakayama & Martini, 2011), and the work has expanded cognitive theories and informed real-world search performance.

Most research has focused on the role of "bottom-up" and/or "top-down" influences (for further discussion about this dichotomy, see Awh, Belopolsky, & Theeuwes, 2012). Bottom-up influences represent how the display affects visual processing (for a review, see Theeuwes, 2010). Typical bottom-up factors include target shape, target color, the relative physical stimulus differences between the target and distractors, number of distractors, and other such stimulus-level attributes. For example, strong contrast differences (e.g., one red item in a sea of blue items) can lead to pop-out search, in which one particular

☆ This manuscript includes a subset of a larger dataset that was used for a prior publication (Biggs, Cain, Clark, Darling, and Mitroff, 2013). The current dataset combines this subset with new participants who had not completed the visual search task at the time of the 2013 publication. Personality assessments and their related hypotheses were not involved in the previous work, and therefore these data present new visual search data with an independent set of hypotheses regarding the role of personality in visual search. The authors have no financial or non-financial competing interests in this manuscript. This work was partially supported by the Army Research Office (grants W911NF-09-1-0092 and W911NF-14-1-0361; proposal 68649-LS) and through a subcontract with the Institute for Homeland Security Solutions, a research consortium sponsored by the Resilient Systems Division in the Department of Homeland Security (DHS) through Contract No. HSHQDC-08-C-00100. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the official policy or position of DHS or of the U.S. Government. The study is approved for public release. The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government. LT Biggs is a military service member (or employee of the U.S. Government). This work was prepared as part of his official duties. Title 17 U.S.C. §105 provides that 'Copyright protection under this title is not available for any work of the United States Government.' Title 17 U.S.C. §101 defines a U.S. Government work as a work prepared by a military service member or employee of the U.S. Government as part of that person's official duties.

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item is so physically salient that it automatically stands out to the observer (Treisman & Gormican, 1988). Bottom-up factors primarily impact visual search by determining which items will be the most physically salient and therefore the most likely to be noticed. This powerful influence has yielded saliency models that predict substantial proportions of attentional distribution and eye movements based solely upon physical aspects of a visual display (e.g., Itti, Koch, & Niebur, 1998).

Top-down influences generally represent goal-directed or strategy-level influences on search performance. These influences can include factors such as the relationship between target-defining properties and distractors most likely to capture attention (Folk & Anderson, 2010; Folk & Remington, 2008; Gibson & Kelsey, 1998). The primary idea is that goal-relevant characteristics determine what aspects of a visual display will receive the most attention. The evidence for top-down influences is varied; for example, data show attentional priorities can be altered based upon which targets yield the greatest reward (Anderson, Laurent, & Yantis, 2011a, 2011b; Anderson & Yantis, 2013) and by sufficient experience with a specific task (Cosman & Vecera, 2014; Cunningham & Egeth, 2016; Hout & Goldinger, 2010; Leber & Egeth, 2006a, 2006b; Vatterott & Vecera, 2012). A change in the task can then alter what an individual prioritizes during visual search, such as how changing the high reward target color from red to green will have searchers shift their priorities from finding red targets to finding green targets. In short, the specific search task and its associated goals allow for assessment of many different parameters that affect how visual search is conducted under a specific set of circumstances.

1.1. Moving beyond the bottom-up and top-down dichotomy

Beyond task-relevant factors influencing visual search, individual differences between searchers can significantly alter visual search behaviors. A prime example involves how certain stimuli can affect search by eliciting emotional reactions from different searchers. For instance, searchers notice stimuli they fear faster than more neutral stimuli (Öhman, Flykt, & Esteves, 2001), and individuals can be distracted by specific stimuli based upon their relative love or hatred for what the stimulus represents (Biggs, Kreager, Gibson, Villano, & Crowell, 2012). Moreover, individual differences can impact visual search performance regardless of the specific stimuli involved. For example, experienced professional visual searchers were shown to be more consistent in using their search strategies, and consistency explained a significant portion of the variance in search accuracy for professional searchers (Biggs, Cain, Clark, Darking, & Mitroff, 2013; Biggs & Mitroff, 2014). This instance potentially demonstrates how individual differences in search strategy might impact key elements of visual search performance.

One understudied potential individual difference aspect is that some individuals might simply be better suited to conducting visual searches. For example, it has been suggested that individuals with autism (or high on autism traits) might have enhanced visual search abilities (O'Riordan, Plaisted, Driver, & Baron-Cohen, 2001). Another possibility is that some personality types might be more compatible with the demands and nuances of visual search tasks. For example, introverts may be better at visual search than extroverts (Sen & Goel, 1981). However, this remains an open question as other work has suggested that introverts perform equally well in visual search (Newton, Slade, Butler, & Murphy, 1992), and that introverts might simply perform better on any sustained attention task (Koelega, 1992). This possibility represents a factor relevant to the individual conducting the search, yet it is not an influence due to specific stimuli, the specific task, or the relationship between the searcher and a particular stimulus. It is also a factor that could be highly impactful and relevant to search accuracy from the moment the individual begins conducting searches (i.e., hiring and selection). As such, personality differences present an intriguing personnel selection mechanism, especially for occupations which heavily rely upon visual search for on-the-job performance, such as airport baggage screening (Biggs & Mitroff, 2015; Mitroff, Biggs, & Cain, 2015) or radiology (Krupinski, 2010, 2015).

Personality factors could also be highly important in personnel selection for other duties where visual search plays an important, but perhaps less conspicuous role. For example, personality differences can serve as early indicators of talent in piloting remote aircraft (Rose, Barron, Carretta, Arnold, & Howse, 2014). Remotely piloting an aircraft, and a slew of other aviation tasks, requires visual search or scanning to complete the task, and so it could be insightful to determine if specific personality traits relate to visual search, per se. Personnel selection for these duties, and more, could be improved by identifying individuals well suited to the task through the relationship between personality and task-based performance. Furthermore, this relationship could provide additional theoretical insight into visual search by exploring an understudied top-down factor in search behaviors.

The current study sought to reveal possible relationships between personality factors and visual search performance. Professional visual searchers from the U.S. Transportation Security Administration (TSA) completed a validated and established self-report survey about their personality characteristics (the Big Five Inventory; John & Srivastava, 1999) and also completed a standard computer-based visual search task. The primary questions at hand are whether one or more personality traits relate to search performance, and whether personality traits account for search accuracy above and beyond other factors.

2. Method

2.1. Participants

TSA Officers (N = 213) participated as part of a broader research project conducted at Raleigh-Durham International Airport. Participation took place during the Officers' regular workday, and numerous steps were taken to ensure confidentiality and voluntary participation. First, TSA Officers could choose to participate in the study or review training materials during the allotted time. Second, all TSA officials were unaware which individuals participated and which individuals reviewed training materials. Third, TSA Officers were asked whether they would allow their data to be used only for TSA purposes or both university research and TSA purposes (10 participants declined and 3 did not explicitly consent; data from these 13 individuals were excluded). Data presented here comes only from participants who completed the personality survey, completed the visual search experiment, and consented to have their data used for research purposes (N = 213 from the larger study).

Data were further limited based upon several criteria. First, data were limited to those who regularly conducted X-ray searches as part of their primary duties (N = 58 did not regularly perform searches). Second, data were limited to individuals under 65 years of age (N = 6 were over 65 years). Third, data were limited to participants whose search task accuracy was within three standard deviations of the group mean (N = 4 were below three standard deviations of the group mean in accuracy). Finally, personality subscale analyses were limited to participants who completed all questions of that subscale. For example, the conscientiousness subscale has 9 questions, and data from any participant who answered 8 or fewer questions were excluded for analyses involving that particular subscale. These restrictions left the following counts for participants who met all criteria listed above and completed the personality metric: N = 127 for neuroticism, N = 126 for extraversion, N = 130 for openness, N = 127 for agreeableness, and N = 122 for conscientiousness.

Ages were reported in ranges with the following distribution: N = 5 between 18 and 25 years of age, N = 38 between 26 and 34 years of age, N = 44 between 35 and 50 years of age, and N = 58 between 51 and 65 years of age. The sample included 53 female participants and 90 male participants (no response given for two participants). For some analyses, TSA Officers were divided into groups based upon experience:

individuals with 3 or fewer years of TSA employment were classified as "early-career" TSA Officers (N = 40), and individuals with 6 or more years of TSA employment were classified as "experienced" TSA Officers (N = 54).

2.2. Design

Data reported here come from a larger initiative, which took place from October 2011 through June 2013. Participants completed one to four experimental sessions with each session containing different procedures. The hypotheses here are concerned with a simple visual search task and personality assessment administered during the first and fourth sessions, respectively. The personality survey was the Big Five Inventory (BFI; Benet-Martinez & John, 1998; John & Srivastava, 1999; John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008), which includes 44 questions addressing five primary personality factors (neuroticism, extraversion, openness, agreeableness, conscientiousness). Thorough psychometric validation of this scale is widely cited and available (Benet-Martinez & John, 1998; John & Srivastava, 1999), which developed more through classic test theory than advanced item response theory (cf., Lange, Irwin, & Houran, 2000). The BFI is easily available, not overly long, and it has been used in hundreds of studies. Taken together, these factors made it an ideal personality assessment for the current study.

2.2.1. Apparatus

Participants were tested in a private room away from airport security checkpoints on Dell Vostro 260 computers and 23.6-inch widescreen LCD monitors. Dividers separated six testing stations in a dimly lit room. Experimental presentation and data collection were performed using Matlab software (The MathWorks, Natick, MA) and Psychophysics Toolbox version 3.0.8 (Brainard, 1997; Kleiner, Brainard, & Pelli, 2007; Pelli, 1997).

2.2.2. Stimuli

Search displays presented multiple pseudo-"L"s as distractors with 50% of displays containing one target "T." Individual display items were comprised of two perpendicular black lines (subtending 1.3°× 1.3°, width = 0.3°). The crossbar aligned perfectly with the other line segment to form target "T"s, whereas the crossbar slid off-center for distractor pseudo-"L"s (see Fig. 1). All display items were randomly placed onto an invisible 8 × 7 grid subtending 25.4°× 19.1° at an approximate viewing distance of 60 cm. Individual grid cells did not overlap, all items were presented against white backgrounds, and random spatial jitter was applied to individual cell items. Display items were randomly rotated (0°, 90°, 180°, and 270°). Set size varied with four possible options: 8, 16, 24, and 32.

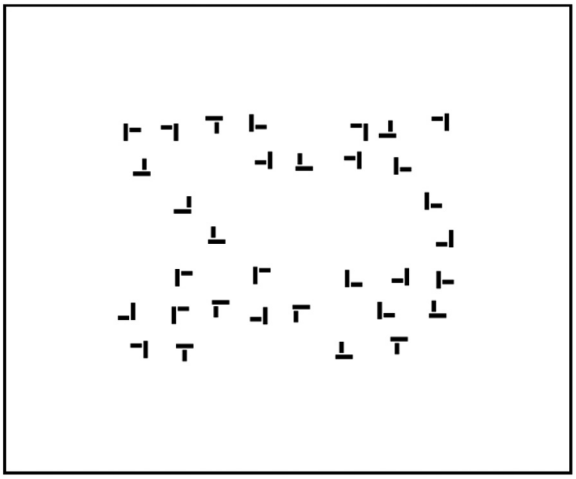

Fig. 1. Sample display from the visual search task.

2.2.3. Search procedure

Trials began with a fixation cross for 100 ms. The search array then appeared and remained on-screen until response or until 30 s elapsed. Participants responded with target presence or target absence judgments by pressing one of two keys ("z" and "/", counterbalanced across participants). The full experiment included practice (16 trials) followed by experimental trials (256 trials). Practice and experimental trials included an equal mix of target present and target absent trials equally divided among the four set sizes. Participants received accuracy feedback for practice trials, but no feedback for experimental trials. Search displays disappeared after response and the program proceeded automatically to the next trial. Breaks were provided every 25 experimental trials.

3. Results

3.1. Descriptive statistics

See Table 1 for visual search metrics divided by set size. Participants averaged reasonably high search accuracy with a range of values (Mean = 87.53%, SD = 6.13%, Minimum = 72.66%, Maximum = 98.44%). Misses were the predominant error source (Mean = 29.36 missed targets, SD = 14.89 missed targets, Minimum = 2, Maximum = 69), whereas false alarms accounted for only a small portion of errors (Mean = 1.81 false alarms, SD = 3.21 false alarms, Minimum = 0, Maximum = 20). Notably, many participants did not have any false alarms (61 of 145 participants had 0 false alarms). Given that misses were the primary source of error, personality measures were compared to the number of missed targets to represent the accuracy variable from visual search

Age and gender are potential predictor variables for search performance; however, neither age ($F(3141) = 1.87$, $p = 0.14$) nor gender ($t(141) = 1.85$, $p = 0.07$) emerged as significant predictors of search accuracy. Age also had no impact on speed as a 4 (age groups: 18–25, 26–34, 35–49, 50–64) × 4 (set sizes: 8, 16, 24, 32) ANOVA revealed no significant effects of age on hits (p's > 0.15) or correct rejections (p's > 0.50). The previous study (Biggs et al., 2013) did find minor age-related effects with slower responses from older participants, although several possibilities could explain the difference. First, the previous study demonstrated only a small effect, and this study analyzed a smaller sample size. Another possibility is that the age groups were not sensitive enough, especially as these age groups were selected to provide some demographic information while also ensuring participant anonymity. For the purposes of the further analyses, neither age nor gender significantly influenced accuracy on the visual search task, and so they are not further considered here as predictors of visual search accuracy.

Personality measures yielded a range of responses (Neuroticism: Mean = 2.29, SD = 0.84; Extraversion: Mean = 3.48, SD = 0.76; Openness: Mean = 3.69, SD = 0.56; Agreeableness: Mean = 4.09, SD = 0.63; Conscientiousness: Mean = 4.23, SD = 0.55). Note that these values generally fall within one standard deviation or less for values attained from previous studies involving these age ranges (John & Srivastava, 1999).

None of these visual search or personality metrics had a skewness or kurtosis value greater than one or less than negative one. These values satisfy the statistical requirement of between negative two and positive two to support a normal, univariate distribution (George, 2003). The single exception involved false alarm values, which had a skewness of 2.06 and a kurtosis of 4.97. This non-normal distribution further supported the decision to focus on misses as the dependent variable for accuracy when comparing search performance to personality measures.

Table 1
Average accuracy and response times by set size (with standard errors in parentheses).

	Set size			
	8	16	24	32
Accuracy	92.59% (0.44%)	88.39% (0.60%)	85.68% (0.65%)	83.46% (0.63%)
Hit response time	3.33 s (0.07 s)	5.26 s (0.12 s)	6.90s (0.17 s)	8.53 s (0.19 s)
Correct rejection response time	5.53 s (0.12 s)	9.30s (0.21 s)	12.60s (0.28 s)	15.52 s (0.33 s)

3.2. Visual search metrics and personality measures

The primary question was whether any personality factors related to search accuracy. Only one personality factor was significantly correlated with accuracy in the visual search task: conscientiousness, $r(120) = -0.25$, $p < 0.01$, $BF_{10} = 4.53$. Participants were more likely to miss targets as their conscientiousness score decreased. No other factors were related to search accuracy (Neuroticism: $r(125) = 0.06$, $p = 0.47$, $BF_{10} = 0.14$; Extraversion: $r(124) = -0.05$, $p = 0.61$, $BF_{10} = 0.13$; Openness: $r(128) = 0.07$, $p = 0.41$, $BF_{10} = 0.15$) with only agreeableness even approaching significance (agreeableness: $r(125) = -0.15$, $p = 0.08$, $BF_{10} = 0.50$). The relationship between number of misses and conscientiousness was also evident at both the smallest and largest set sizes; conscientiousness was significantly correlated to number of misses at set size 8, $r(120) = -0.21$, $p = 0.02$, $BF_{10} = 1.64$, and at set size 32, $r(120) = -0.25$, $p < 0.01$, $BF_{10} = 4.63$. Therefore, conscientiousness was related to accuracy for both the easiest and most difficult searches in this experiment

With regard to response times, increased time to find the target as display set size increased (i.e., hit-slope) was significantly related to conscientiousness, $r(120) = 0.18$, $p = 0.04$, $BF_{10} = 0.84$, although the increase in time to correctly identify target absence as display set size increased (i.e., correct rejection slope, CR-slope) was not related to conscientiousness, $r(120) = 0.13$, $p = 0.16$, $BF_{10} = 0.30$. Agreeableness was also marginally related to hit-slope, $r(125) = 0.17$, $p = 0.06$, $BF_{10} = 0.61$, but not CR-slope, $r(125) = 0.13$ $p = 0.20$, $BF_{10} = 0.30$. No other relationship between personality factors (neuroticism, extraversion, and openness) approached a significant relationship with either hit-slope or CR-slope (all $ps > 0.20$).

Visual search accuracy can also be explained, in part, by response time metrics. So, it is reasonable to question whether hit-slope could be a latent variable that explains part of the relationship between number of misses and conscientiousness. However, the relationship between number of misses and conscientiousness remained significant even when conducting a partial correlation and controlling for the influence of hit-slope, $r(119) = -0.18$, $p = 0.04$.

3.3. Early-career versus experienced searchers

Previous research demonstrated that different aspects of performance predict search accuracy among different groups based upon prior search experience. For example, two factors can predict most variability in search accuracy among professional searchers: CR-slope and consistency (Biggs et al., 2013). CR-slope, or the change in time taken to correctly identify that no targets are present based upon different display sizes, was a stronger predictor of search accuracy among early-career searchers than among highly experienced professional searchers. Conversely, search consistency, or how similarly an individual used a strategy between displays, predicted a large amount of accuracy variability for highly experienced professional searchers, but consistency only predicted a small amount of accuracy variability for early-career professionals with less professional search experience. As with these other factors, conscientiousness may not have a uniform impact on visual search accuracy for both early-career professional searchers and highly experienced professional searchers.

The previous evidence (Biggs et al., 2013) establishes a practical reason to include both CR-slope and search consistency into regression models to predict search accuracy. Additionally, large CR-slopes indicate that a search takes additional time to find targets, which increases accuracy at the cost of speed. CR-slope thus allows for an empirical investigation into any speed/accuracy trade-offs in the data. The regression models here account for this possibility by including CR-slope in the calculations. Finally, without clear theoretical reasons how conscientiousness might interact with CR-slope or consistency, the regression models will be standard multiple regressions. To compare the influence of conscientiousness among groups with differing levels of professional experience, professional searchers were divided into those individuals with the least experience (i.e., 3 years or less professional experience, $N = 40$, "early-career") and those individuals with the most experience (i.e., 6 years or more professional experience, $N = 54$, "experienced").

For early-career professionals, there was a significant relationship between number of misses and conscientiousness, $r(38) = -0.39$, $p = 0.01$, $BF_{10} = 3.82$. A regression analysis was conducted to simultaneously assess contributions of three known predictors of search accuracy—CR-slope, consistency, and conscientiousness. The regression analysis predicted a significant amount of variance in misses, Adj. $R^2 = 0.46$. $F(3,36) = 12.24$, $p < 0.001$ (CR-slope: $\beta = -0.61$, $t(39) = 5.00$, $p < 0.001$, $BF_{10} = 2941.40$, $sr^2 = 0.34$; consistency: $\beta = -0.01$, $t(39) = 0.09$, $p = 0.93$, $BF_{10} = 0.37$, $sr^2 < 0.01$; conscientiousness: $\beta = -0.29$, $t(39) = 2.40$, $p = 0.02$, $BF_{10} = 4.02$, $sr^2 = 0.14$). CR-slope was the largest predictor of search accuracy, followed by conscientiousness.

For experienced professionals, there was a significant relationship between number of misses and conscientiousness, $r(52) = -0.29$, $p = 0.04$, $BF_{10} = 1.45$. A regression analysis was conducted to simultaneously assess contributions of three known predictors of search accuracy—CR-slope, consistency, and conscientiousness. The regression analysis predicted a significant amount of variance in misses, Adj. $R^2 = 0.61$. $F(3,50) = 28.70$, $p < 0.001$ (CR-slope: $\beta = -0.59$, $t(53) = 6.62$, $p < 0.001$, $BF_{10} = 322{,}347.78$, $sr^2 = 0.32$; consistency: $\beta = 0.41$, $t(53) = 4.69$, $p < 0.001$, $BF_{10} = 197.51$, $sr^2 = 0.16$; conscientiousness: $\beta = -0.13$, $t(53) = 1.46$, $p = 0.15$, $BF_{10} = 1.80$, $sr^2 = 0.02$). CR-slope was again the largest predictor of search accuracy, followed by consistency.

4. General discussion

The current study investigated whether personality differences could predict variability in performance on a visual search task. Personality was assessed via the Big Five Inventory (John & Srivastava, 1999; John et al., 1991), which is an established survey that delineates five personality traits: neuroticism, extraversion, openness, agreeableness, and conscientiousness. Of these "big five" personality factors, only conscientiousness significantly predicted performance in an established visual search task. Taking a step back, it is not necessarily surprising to find a significant relationship between conscientiousness and search performance, especially in the context of visual monitoring or surveillance tasks that require sustained effort throughout a long performance period.

It is noteworthy that conscientiousness played a significant role in predicting search here, whereas previous studies showed a larger relationship between introversion/extraversion and visual search (e.g., Newton et al., 1992). Conversely, some recent evidence has shown a smaller impact of personality compared to some other factors, such as visual working memory capacity or vigilance (Peltier & Becker, 2017). This difference could be attributable, in part, to the population samples—whereas most studies used undergraduate participants, the current study focused on a professional search population. Visual search could have a significant impact on many different careers. Although the connection is evident with security screening (e.g., Biggs & Mitroff, 2015) or radiology (Krupinski, 2015), other professions from first responders to insect exterminators may depends upon visual search abilities. These various search tasks may be so different though that not all predictors are equally effective across all scenarios. In turn, multiple studies may be necessary to identify particular predictors within a given professional environment. Nevertheless, conscientiousness could be a powerful factor to include when making hiring and selection decisions.

Personality differences also address an understudied impact on the bottom-up versus top-down dichotomy in attention research. Most studies focus upon bottom-up differences as physical differences within the display (e.g., Itti et al., 1998; Theeuwes, 1992) and top-down differences as task-relevant contingencies (e.g., Anderson et al., 2011a; Folk et al., 1992). Some recent evidence has explored how the specific observer—rather than the specific display or specific task—might contribute another significant influence upon visual attention. For example, different individuals react differently to the exact same stimulus based upon their knowledge of that stimulus (Biggs et al., 2012). Personality differences represent another top-down influence on visual search, albeit one entirely independent of the stimuli or task. This task-detached role provides an interesting aspect to consider when examining factors that might influence search strategy, search efficiency, or other behaviors in visual search such as quitting rules (cf. Wolfe & Van Wert, 2010). If nothing else, it further supports moving away from a purely bottom-up or top-down dichotomy or even continuum in visual search and towards visual attention models that incorporate additional factors (e.g., Awh et al., 2012).

An important limitation for the present study is that it only included a single type of visual search task. In this experiment, participants performed a difficult variant of a classic "Ts and Ls" search, where the primary errors involved missed targets. Although this error is particularly important in professional situations such as at security checkpoints—where missed targets could be explosive devices, there are additional task-relevant factors that could also affect the relationship between personality and search accuracy. For example, search accuracy declines if targets rarely appear during a search task (e.g., Wolfe, Horowitz, & Kenner, 2005), search accuracy is very low for specific targets which rarely appear (Biggs, Adamo, & Mitroff, 2014; Mitroff & Biggs, 2014), search becomes increasingly difficult as multiple target types are added (e.g., Cunningham & Wolfe, 2012, 2014; Drew & Wolfe, 2014; Godwin, Menneer, Cave, & Donnelly, 2010; Wolfe, 2012), and the simultaneous presence of multiple different targets dramatically affects search behaviors (e.g., Wolfe, 2013). All these examples represent significantly different visual search tasks, and conscientiousness may or may not play an equal role in influencing visual search under each unique set of parameters. Nevertheless, the current evidence does suggest that future research should consider conscientiousness assessments if analyzing the role of personality in these various alternative search tasks.

In conclusion, personality represents another potent factor in visual search. The evidence here suggests that conscientiousness is the predominant personality influence, although personality differences may interact with search accuracy differently for very different visual search tasks (e.g., rare-target search). These findings indicate that conscientiousness assessments could prove useful during hiring and selection procedures when trying to identify appropriate candidates for a task or career that integrates visual search abilities as a key element in on-the-job performance. Future research may reveal many more task-irrelevant, top-down factors influencing visual search than have been previously considered, and these factors could prove invaluable to hiring and selection assessments for certain careers.

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