In the modern world, distraction is unavoidable. Smartphone users face frequent social media notifications and text messages, employees struggle to manage multiple tabs on an Internet browser, music and talk radio is available in even the most desolate locations, and hands-free cell phone and Bluetooth devices allow conversations to continue anytime, anywhere. However, these distractions can be deadly; at any given moment, roughly 660,000 U.S. drivers are using their cellphones while driving (Pickrell & Ye, 2013), and those drivers are 23 times more likely to be involved in a crash or near-crash while on the road than nondistracted drivers (Olson, Hanowski, Hickman, & Bocanegra, 2009). These findings have serious implications in various occupational fields requiring intense concentration in which distraction can produce grave consequences. Those who have yet

The Relationship Between Extraversion and Listening Comprehension Under High- and Low-Salience Visual Distraction Conditions
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ABSTRACT. The present study contributed to the body of research examining the link between level of extraversion and response to sensory stimulation. Previous studies have shown that introverts are more susceptible to, and therefore more distracted by, forms of auditory stimulation than extraverts when completing cognitive tasks. However, no study has examined the differing effects of solely visual stimulation on both distraction and cognitive task performance. Using 90 undergraduate college students as participants, this study tested 3 hypotheses: (a) we expected a negative correlation between level of extraversion and self-reported distraction while under high-salience visual stimulation; (b) we predicted a positive correlation between participants’ extraversion score and performance on a listening comprehension task while under high-salience visual stimulation, defined operationally as number of comprehension questions answered correctly; and (c) we expected that the aforementioned correlation would be higher than the correlation between level of extraversion and performance on a listening comprehension task while under low-salience visual stimulation. Although results did not lend support to the idea of these differences in sensory stimulation applying to different forms of visual stimulation (for all correlations, p = n.s.), we highlight the theoretical and practical implications of these findings. We provide specific suggestions for future research to help identify those most susceptible to distractions as well as how to best protect individuals from their detrimental consequences.

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to enter the workforce are detrimentally affected by distraction as well. Research has shown that the most effective way to improve high school students’ test scores on standardized exams is to enact school-wide bans on smartphones, which act as sources of both visual and auditory distraction (Beland & Murphy, 2015).

Although multitasking is often expected in many different situations, not all individuals are able to handle outside distractors easily; some find it difficult to concentrate even in the most tranquil environments, and others cannot focus on a task at hand without being overwhelmed by the hum of hectic daily life. When it comes to susceptibility to outside distraction, it appears that individual differences matter more than the actual distractors themselves, and research on sensory distraction has shown that these crucial differences lie in individual personality traits (Eysenck & Graydon, 1989; Furnham & Allass, 1999; Furnham & Bradley, 1997). Knowing exactly which personality characteristics make individuals more susceptible to outside distraction has practical applications in vehicles, workplaces, school, and other social settings. For instance, knowing that drivers with extreme scores on certain dimensional personality characteristics are more likely to be distracted by conversing with a passenger while driving can have a strong preventative impact on accident and mortality rates through civilian education. Similarly, a teacher who understands why seating students next to a window will have a differential effect on individual performance in class based on respective personality characteristics has the opportunity to amplify the chance of success for each and every student, sparking a positive ripple effect extending far beyond the confines of a classroom.

Theories of Stimulation and Performance

The Yerkes-Dodson law (Yerkes & Dodson, 1908) states that there is a distinct bell-shaped relationship between arousal and task performance, with increasing levels of arousal being associated with better task performance up to a point, after which higher levels of arousal lead to a decrease in performance. People therefore have an arousal level at which they perform best, although this “sweet spot” is unique to each individual. Hans Eysenck attributed this variance in people’s ability to handle outside distractors to their level of extraversion and posited that the basis of this personality difference was physiological in nature. Eysenck suggested that the optimal level of stimulation was lower for introverts than for extraverts, and that this difference was determined by the stringency of the ascending reticular activating system (ARAS), which is connected to the cerebral cortex and is responsible for filtering the flow of outside stimulation to the brain (Eysenck, 1967). Eysenck’s theory proposed that the ARAS of introverts was not as stringent as the ARAS of extraverts, allowing a surplus of stimulation to reach the brain and causing introverts to reach their peak optimal level of arousal more quickly than extraverts. Conversely, the ARAS of extraverts is highly stringent, filtering out more outside stimulation and therefore leading extraverts to crave social and arousing environments in order to reach their optimal level of arousal.

Early Sensory Studies

Ensuing research tested the theory that, when faced with equal levels of external stimulation, the way individuals respond is dependent upon their level of extraversion. Corcoran’s (1964) research created a ripple effect when this theory was applied to the sense of taste and demonstrated that introverts salivated more than extraverts when drops of lemon juice were placed on their tongues. Eysenck replicated these results in adults (Eysenck & Eysenck, 1967), and later research confirmed these findings among college students (Howarth & Skinner, 1969) and children (Casey & McManis, 1971). Complementary studies extended this lower sensory threshold to pain perception as well, finding a positive correlation between level of extraversion and pain tolerance (Haslam, 1967). These studies supported Eysenck’s theory as applied to sensory stimulation.

It has also been shown that introverts and extraverts experience these cortical arousal differences during routine activities; when given the choice of study location in a library, there is a positive relationship between college students’ level of extraversion and the amount of potential distraction in their preferred location (Campbell & Hawley, 1982). Test scores covering retention of studied material, however, have not been compared.

Auditory and Musical Distraction

Eysenck’s interpretation of the Yerkes-Dodson law has most commonly been demonstrated through studies of auditory stimulation. When individuals scoring in the extremes on the Eysenck Personality Inventory (EPI) Extraversion scale were presented with a paired-associate learning task and had the
ability to adjust the intensity of white noise distraction, the mean volume for introverts was much lower than that of extraverts (Geen, 1984). However, physiological measures indicated that both groups were equally aroused during their choice volume exposure. Furthermore, when introverts were assigned to complete the learning task while listening to preferred extravert white noise levels, their performance dropped markedly.

Results of past research have also revealed that, when noise level is increased from quiet (45dB) to low-level noise (60dB), introverts are both more physiologically aroused and perform worse on Law School Admissions Test (LSAT) reading comprehension tests than their extraverted counterparts (Standing, Lynn, & Moxness, 1990). Interestingly, one study concluded that the relationship seems to be affected by the task-relevance of the noise; when a high-complexity problem was paired with task-relevant noise, introverts performed much worse than extraverts under the same conditions. However, when the distraction stimuli were not related to the task stimuli, both groups performed equally well. Being that this was the only study to consider stimulation relevance and results have not been replicated, no definitive conclusions can be drawn (Eysenck & Graydon, 1989).

Auditory stimulation frequently exists in the form of music, which has been shown to have a more complex impact on distraction. For introverts, both short term memory and reading comprehension abilities suffer when completed in the presence of music compared to baseline scores taken during silence, but scores for extraverts do not differ between conditions. Moreover, the level of distraction reported by participants in a posttest questionnaire correlates negatively with Eysenck Personality Questionnaire (EPQ) Extraversion scores, suggesting that introverts find the same level of music to be more distracting than their extraverted counterparts (Furnham & Bradley, 1997). Interestingly, other factors found to correlate positively with EPQ scores include reported frequency of radio listening while working as well as the frequency of radio listening in general.

As noted with noise distractions, the complexity of the music can impact individual cognitive abilities as well. Research has found significant interactions between an individual’s level of extraversion and performance on both memory and observation tests in the presence of both simple and complex music, categorized by variations in “tempo, rhythmic tonality, melodic complexity and vocal meaningfulness” (Furnham & Allass, 1999). Interestingly, results have noted a crossover effect: when exposed to simple music, introverts perform better on cognitive tasks when compared to baseline scores during silence, but extraverts perform worse. When exposed to complex music, extraverts perform better on cognitive tasks when compared to baseline scores during silence, and introverts perform worse. Although the same directional trends were found during assessment of reading comprehension tasks, the results were not significant. No difference was reported in distraction between introverts and extraverts during the simple noise condition, and a large discrepancy was found during the complex music task.

**Television Distraction**

Accordingly, outside stimulation involving both auditory and visual distraction has proven to be just as impactful. When completing Graduate Management Admission Test (GMAT) reading comprehension passages in front of a television playing a popular drama series, introverts performed significantly worse on passage questions than extraverts, with no difference in proficiency existing between the two groups during silence (Furnham, Gunter, & Peterson, 1994).

Research has also shown that the addition of television distraction during the question portion of reading comprehension assessment presents no further decrement in reading comprehension ability for either personality type, supporting the idea that forms of distraction impact cognitive abilities during encoding of information as opposed to retrieval (Armstrong & Chung, 2000).

It is clear that differences between individuals extend beyond their levels of extraversion, yet extraversion is the only Big Five trait that has shown any impact on reading comprehension while in the presence of television distraction (Ylias & Heaven, 2003). Neuroticism, openness, agreeableness, and conscientiousness have thus far failed to show any involvement in the complex relationship between reading comprehension and both auditory and visual stimulation.

**Present Study**

Although the relationships between auditory distraction, reading comprehension, and extraversion have been studied at length, very limited research has examined the impact of sources of distraction that are purely visual. A handful of studies dating back to the early and mid-20th century that attempted to answer this
Extraversion and Listening Comprehension

The current study examined three hypotheses, the first being that there would be a negative correlation between level of extraversion and self-reported distraction while under high-salience visual stimulation—meaning that the higher a participant’s level of extraversion, the lower their reported level of distraction as a result of viewing high-salience visual stimulation. Data supporting this first hypothesis would be the first to suggest that Eysenck’s theory of sensory threshold differences between introverts and extraverts—shown by previous research to be applicable to the senses of taste (Corcoran, 1964), touch (Haslam, 1967), and hearing (Furnham & Bradley, 1997; Geen, 1984)—could be extended to isolated visual stimulation as well. Since Eysenck’s theory utilized the term “sensory” as an all-encompassing label, results of this study assessing visual stimulation should mirror the promising results of studies that assessed other forms of sensory stimulation.

Second, we hypothesized a positive correlation between participants’ extraversion score and performance on a listening comprehension task (defined operationally as the number of comprehension questions answered correctly) while under high-salience visual stimulation. This would indicate that the higher a participant’s level of extraversion, the more comprehension questions the participant would answer correctly for passages listened to while under high-salience visual stimulation. Data supporting the second hypothesis would demonstrate that the differential relationships between auditory stimulation salience and comprehension performance between introverts and extraverts (as supported by previous studies) can also be elicited from visual stimulation, further affirming the inclusive nature of Eysenck’s theory of sensory stimulation.

Finally, we hypothesized that the correlation posited in our second hypothesis would be stronger than the correlation between level of extraversion and performance on a listening comprehension task while under low-salience visual stimulation. Confirmation of our third hypothesis would suggest that the more salient the stimuli, the better extraverted individuals perform—even if the form of stimuli is visual. In turn, this would also be the first study to demonstrate that the impact of differing levels of auditory stimulation salience on comprehension performance (Furnham & Allass, 1999; Furnham & Bradley, 1997) can also be elicited from differing levels of visual stimulation, providing further support for the idea that Eysenck’s theory of sensory stimulation and performance can be applied to any sensory modality.

Method

Participants

This study included 111 undergraduates, 20 of whom were excluded from analyses because they obtained test scores suggesting invalid response styles (as described in the next paragraph) and one of whom became ill and excused himself during a data collection session. The final dataset consisted of 90 participants (47 women and 43 men; \( M_{age} = 19.00, SD = 1.13 \)) enrolled in foundation psychology courses during fall 2016. Self-reported ethnicity was as follows: 56.7% of participants identified as White/European American, 22.2% as Asian or Asian-American, 8.9% as Hispanic/Latino, 4.4% as Black/African American, 1.1% as American Indian/Alaska Native, and 1.1% as Native Hawaiian/Other Pacific Islander. Participant socioeconomic status while growing up was as follows: 11.1% reported belonging to the upper class, 56.7% to the upper-middle class, 22.2% to the middle class, 5.6% to the lower middle class, and 4.4% to the lower class. Participants were recruited through an online research management system. Participants received research credits as part of a requirement for successful completion of the course.

Materials

Eysenck Personality Inventory (EPI). Each participant completed the EPI, a 57-item scale that assesses levels of both extraversion and neuroticism by having participants respond to statements with either a “yes” or a “no.” The EPI also includes a 9-question Lie scale. Reliability coefficients ranging from .50 to .87 have been reported (Farley, 1971). For the purpose of this study, only the 24-item Extraversion scale was included in analyses, although abnormally high scores on the Lie scale excluded a total of 20 participants from the sample.

Listening comprehension. Passages and questions were selected from Peterson’s Master the Catholic High School Entrance Exams 2014 booklet (“Reading Comprehension,” 2013). Passages were selected based on length, number of questions, and diversity of topic. The text of the passages was

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|---|---
| Question either failed to successfully filter out auditory stimulation and therefore did not truly isolate the effects of purely visual stimulation (Hovey, 1929) or utilized outdated definitions and measures of extraversion that have since been revised (Shanmugan & Santhanam, 1964). | The current study examined three hypotheses, the first being that there would be a negative correlation between level of extraversion and self-reported distraction while under high-salience visual stimulation—meaning that the higher a participant’s level of extraversion, the lower their reported level of distraction as a result of viewing high-salience visual stimulation. Data supporting this first hypothesis would be the first to suggest that Eysenck’s theory of sensory threshold differences between introverts and extraverts—shown by previous research to be applicable to the senses of taste (Corcoran, 1964), touch (Haslam, 1967), and hearing (Furnham & Bradley, 1997; Geen, 1984)—could be extended to isolated visual stimulation as well. Since Eysenck’s theory utilized the term “sensory” as an all-encompassing label, results of this study assessing visual stimulation should mirror the promising results of studies that assessed other forms of sensory stimulation.

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presented orally to participants through a prerecording to ensure standardization between groups. Each passage was followed by eight multiple-choice questions with answer choices A through D that assessed participants’ comprehension of the passage. The listening comprehension text and passage questions have been archived at https://osf.io/quy3s/.

**Distraction questionnaire.** Participants completed a single-item questionnaire asking them to rate how distracted they were during each condition using a response scale that ranged from 1 (*not at all distracted*) to 10 (*very distracted*). The distraction questionnaire has been archived at https://osf.io/quy3s/.

**Low-salience visual stimulation.** A 5-minute muted sample of a video of crashing beach waves was used to create relatively low-salience visual distraction. Due to the predictable and repetitive nature of crashing beach waves, researchers and collaborators agreed that the scene provided participants with a form of low-complexity stimulation that would incite levels of objective stimulation comparable to—as well as serve as the rough visual equivalent of—the low-level noise (Standing et al., 1990) and low-complexity music (Furnham & Allass, 1999) employed by researchers studying auditory forms of distraction. The video has been archived at https://osf.io/quy3s/.

**High-salience visual stimulation.** A 5-minute muted sample of a *Looney Toons* cartoon was used to create high-salience visual stimulation. Due to the lack of predictable visual content, speed of character movement, and erratic nature of the plotline of the cartoon, researchers and collaborators agreed that the scene provided participants with a visual form of high-complexity stimulation that would incite relatively high levels of distraction among participants in the same way that high-level noise (Standing et al., 1990) and high-complexity music (Furnham & Allass, 1999) was able to do in previously performed auditory distraction studies. The video has been archived at https://osf.io/quy3s/.

**Procedure**

After institutional review board approval (16-04-260), participants signed up for the study on an online research management system and provided informed consent. One-hour research sessions were conducted in classrooms. Upon arrival, participants were given prenumbered optical-scanned answer sheets that randomly assigned them to proceed to one of two classrooms. In the first classroom, participants completed the control condition task, the low-salience visual stimulation task, and then the high-salience visual stimulation task. This classroom was under the direction of the principal investigator. To counterbalance conditions and rule out the potential for any order effects, participants assigned to the second classroom completed the control condition task, the high-salience visual stimulation task, and then the low-salience visual stimulation task. This classroom was under the direction of a research assistant. The number of participants in each experimental session were split evenly between the two classrooms.

Once all participants were seated, each received a copy of the EPI and was asked to answer the questions as honestly and accurately as possible. Researchers told participants to wait quietly upon completion for further instructions.

Once all participants were finished, researchers collected the EPI assessments and set up the blank projector screen to begin the control condition. Researchers told participants that they would be listening to a recording of somebody reading a comprehension passage aloud and would be asked to answer questions based on the passage when the recording was completed. Researchers directed participants to keep their auditory attention on the passage and their visual attention on the blank projector screen.

The recorded passage was played for 5 minutes, and then researchers distributed the listening comprehension questions. Researchers advised participants to answer the questions to the best of their ability and record their answers on their answer sheet. Researchers told participants they had 5 minutes to answer the questions and to sit quietly once they had completed the questions.
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In the first classroom, participants completed two more auditory comprehension tasks, the first while under the influence of the low-salience visual stimuli and the second while under the influence of the high-salience visual stimuli. In the second classroom, participants listened to the same passages in the same order, but the visual stimulations were presented in reverse order: the first experimental passage was presented with the high-salience stimuli (cartoon video) while the second passage was presented with the low-salience stimuli (waves video).

Once both experimental conditions were completed, participants were given the Distraction Questionnaire and rated their level of distraction during each of the three conditions. Questionnaires and answer sheets were then collected and the researchers thanked the students for their participation in the study. After all research sessions were completed, all participants were entered into a raffle to win a $100 Amazon gift card.

Results

EPI Results
Scores on both the Extraversion scale (M = 15.31, SD = 4.36) and the Neuroticism scale (M = 14.04, SD = 4.44) were found to be normally distributed and internally consistent for the sample (for both scales, α = .79). Mean scores on the Extraversion scale between participants assigned to Classroom 1 (M = 15.32, SD = 4.24) and Classroom 2 (M = 15.18, SD = 4.29) presented no significant difference between groups (p = .88, d = .03).

Listening Comprehension Passages
Scores on the control passage (M = 5.79, SD = 1.43), first experimental passage (M = 4.71, SD = 1.96), and second experimental passage (M = 4.38, SD = 1.63) were found to be normally distributed but not internally consistent. Cronbach’s α were .37, .61, and .47, respectively.

Independent-Samples t Tests
As shown in Table 1, the participants in Classroom 1 and Classroom 2 differed significantly on the number of listening comprehension passage questions answered correctly, with the mean scores of participants in Classroom 1 (M = 5.46, SD = 1.57) being significantly lower than the mean scores of those in Classroom 2 (M = 6.14, SD = 1.19), t(88) = -2.30, p = .02, 95% CI [-1.27, -.09], Cohen’s effect size value (d = .49) suggested a moderate practical significance. Additionally, a significant difference in mean self-reported distraction rating during the low-salience visual stimulation condition was found between the participants in Classroom 1 (M = 5.17, SD = 2.22) and Classroom 2 (M = 6.44, SD = 2.40), t(88) = -2.66, p = .01, 95% CI [-2.23, -.32]. Cohen’s effect size value (d = .55) suggested a moderate practical significance. There were no other significant differences in dependent variable means between Classroom 1 and Classroom 2.

Paired-Samples t Tests
As shown in Table 2, there was not a significant difference in mean overall comprehension scores between the low-salience and high-salience distraction conditions (M = 4.67, SD = 1.75 and M = 4.51, SD = 1.76, respectively), t(88) = .75, p = .46, 95% CI [.28, .62]. A significant difference was found between the means of self-reported distraction in the low-salience conditions (M = 5.79, SD = .25) and high-salience conditions (M = 7.65, SD = 1.87), t(88) = -6.81, p = .00, 95% CI [-2.40, -1.32].

Correlations
Pearson product-moment correlations were used to examine the relationship between the following continuous variables: extraversion scores, self-reported distraction scores, and listening comprehension scores. As shown in Table 3, correlation coefficients measuring the relationship between self-reported distraction scores during control, low-salience and high-salience conditions and extraversion scores were valued between -0.05 and .03 (for all coefficients, p = n.s.). Coefficients measuring the relationship between listening comprehension scores for each condition and extraversion scores were valued between -.10 and -.03 (for all coefficients, p = n.s.). The correlation between extraversion scores and listening comprehension scores while under low-salience visual stimulation was -.10, while the correlation between extraversion scores and listening comprehension scores while under high-salience visual stimulation was -.09.

Discussion
The purpose of this study was to test the idea that Hans Eysenck’s theory of differential optimal arousal—and the significant differences shown by past research to exist between introverts and extraverts for auditory, tactile, and gustatory stimulation—could also be generalized to visual stimulation. Further, this study sought to determine whether the results of previous research revealing significant differences in performance on cognitive
tasks while in the presence of auditory stimulation between introverts and extraverts could be replicated under the influence of visual stimulation.

The results of the current study did not support any of the three hypotheses. The correlation between participants’ extraversion scores and self-reported distraction under the high-salience visual distraction (cartoon video) condition was not significant. Likewise, the correlation between participants’ extraversion score and performance on the listening comprehension task under the high-salience visual distraction condition was not significant, nor was this correlation significantly higher than the correlation between participants’ extraversion score and performance on the listening comprehension task while under the low-salience visual distraction (waves) condition. This was the first published systematic study to extend Eysenck’s theory of differential optimal arousal to the sense of sight. However, results of this study did not support the idea that these significant differences could also be elicited by visual stimulation.

The results of the current study can be interpreted as lending support to one of two conclusions. The first is that differences in sensory stimulation thresholds and distraction tolerance between introverts and extraverts may be limited only to forms of auditory, gustatory, and somatosensory stimulation and are not applicable to visual stimulation, in which case Eysenck’s theory of sensory threshold differences is not applicable to all bodily senses and is therefore in need of revision. This conclusion would also have practical implications, encouraging public efforts aimed at reducing distraction to focus primarily on forms of distracting stimuli that target the auditory senses. After completion of the study, however, researchers became aware of pitfalls in our research design as well as various ways in which we could have improved upon our study methodology. This introduced an alternate conclusion: this study—being the first that we are aware of to test the effect of sources of visual stimulation—can be interpreted as a critical pilot study with limitations.

One of the most substantial issues that arose in this study was the low internal consistency for each of the three reading comprehension scores (as made evident by all Cronbach’s α scores falling below .62) which suggests that the reading comprehension scores were psychometrically problematic. Previous research examining the impact of auditory distraction upon reading comprehension abilities utilized passages from published standardized tests such as the Law School Admissions Test (Standing et al., 1990) and Graduate Management Admissions Test (Furnham et al., 1994). However, passages from these tests were determined to be too complex to be translated into listening comprehension passages, with many questions requiring readers to refer

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**TABLE 1**

<table>
<thead>
<tr>
<th>Differences in Group Means for Distraction, Comprehension, and Extraversion Scores</th>
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<tbody>
<tr>
<td>Classroom 1 (n = 47)</td>
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<tr>
<td>----------------------</td>
</tr>
<tr>
<td>Self-reported distraction</td>
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<tr>
<td>Control</td>
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<tr>
<td>Waves</td>
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<tr>
<td>Cartoon</td>
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<tr>
<td>Comprehension scores</td>
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<tr>
<td>Control</td>
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<td>Waves</td>
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<tr>
<td>Cartoon</td>
</tr>
<tr>
<td>Extraversion score</td>
</tr>
</tbody>
</table>

Note. Ranges of possible values for variables of interest: self-reported distraction (1–10), comprehension scores (1–8), extraversion score (0–24).

**TABLE 2**

<table>
<thead>
<tr>
<th>Differences in Sample Means for Comprehension and Distraction Scores</th>
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</thead>
<tbody>
<tr>
<td>Total sample (n = 90)</td>
</tr>
<tr>
<td>Waves condition</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>M (SD)</td>
</tr>
<tr>
<td>Comprehension scores</td>
</tr>
<tr>
<td>Self-reported distraction</td>
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</tbody>
</table>

Note. Ranges of possible values for variables of interest: self-reported distraction (1–10), comprehension scores (1–8).

**TABLE 3**

<table>
<thead>
<tr>
<th>Correlations: Extraversion Scores, Self-Reported Distraction, and Listening Comprehension</th>
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<tbody>
<tr>
<td>r Correlation with Extraversion Scores (n = 90)</td>
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<td>Cartoon</td>
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</table>
back to specific lines or terms in the passage—an impossible task when individuals are only listening to a passage and do not have a printed version of the text at their disposal.

The passages and questions chosen for this study were taken from a published practice test booklet for high school entrance exams; the passages were seen as having low levels of complexity and the accompanying questions were believed to test only a surface-level comprehension not requiring repeated reference to passage content. The practice tests were readily accessible to researchers, unlike many official high school entrance exams which are not released to the public. However, the low internal reliability for each of the scores suggests that the assessments were questionable measures of listening comprehension abilities. As a result, it is difficult to know whether the nonsignificant findings were due to an actual absence of a relationship between level of extraversion and listening comprehension under the experimental conditions, or to a statistical artifact associated with the low internal consistency of the comprehension scores. Future research should utilize standardized, published, and psychometrically strong measures to test listening comprehension abilities. Passages and accompanying questions could be taken from the Oral Passage Understanding Scale (OPUS™), which has demonstrated robust internal consistency, test-retest reliability, and interrater reliability (Carrow-Woolfolk & Klein, 2017).

In addition, although randomly assigning participants to one of the two classrooms to counterbalance effects certainly strengthened our experimental methodology, we did find significant differences in dependent variables of interest between classroom groups. Analysis of control condition listening comprehension scores revealed that there was a significant difference in baseline listening comprehension abilities between the groups despite the use of standardized procedures, passage recordings, and scripts/instructions. There was also a significant difference between classrooms in self-reported distraction level elicited by the low-salience visual stimulation condition.

Although every effort was made to create identical experiences for participants in each classroom by standardizing variables over which we had control, we had to secure available classrooms for experimental sessions through the university’s administration, and due to class schedules and concurrent classroom availability, we were given two very different types of classrooms in which to carry out our research. Classroom 1 was a large auditorium-style lecture hall with stadium seating, and Classroom 2 was a smaller classroom with movable seats and desks suitable for discussion-based classes. We also realized that our decision to separate participants into two groups automatically allowed for naturalistic differences to arise between the settings: for example, frequent sneezing by a sick participant in one classroom could have had a large impact on the experience of surrounding participants. There also could have been subtler differences between the classrooms (e.g., lighting, seating arrangement, noise level produced by the movement of chairs) that could have contributed to the creation of very different classroom atmospheres.

Though these classroom differences were limitations of our study, it is unlikely that they accounted for the nonsignificant findings. Because we utilized a within-subjects design, and all three of our hypotheses required only intra-participant data, differences between classrooms presented no major issue if those differences remained consistent throughout the experimental sessions. However, to strengthen methodology, future research should take measures to ensure that, if participants are separated to counterbalance order effects, researchers exercise better control over condition environment to create similarity when at all possible.

Further, because no previous published studies have tested the impact of a solely visual stimulus, we had no precedent to guide either the experimental stimuli selected or the best way in which to elicit different salience levels of visual stimuli. As mentioned in our Method section, we utilized our best judgment in determining what would be seen as low- and high-level visual salience, and the mean self-reported distraction ratings of both classrooms as listed in Table 1 lend support to the idea that we succeeded in eliciting differential levels of distraction among the conditions. However, we neglected to collect feedback regarding the distracting qualities of the videos before executing our study, and this would have been an effective way to lend support to our choices. Doing this also might have encouraged us to find a source of high-salience visual distraction more powerful than the cartoon video to include in our study. Follow-up studies should test the differential distracting qualities of visual stimuli before deciding which stimuli to use in order to confirm that the stimuli will be effective in eliciting targeted levels of visual distraction. In turn, this could help establish a set of standardized sources of visual stimulation for use in future
studies. In addition, future research should use a more comprehensive multi-item assessment to measure self-reported distraction among conditions.

Finally, given our smaller sample size, we believe that the decision to utilize a within-subjects design contributed to the overall strength of our study, and previous studies examining sensory distraction differences have been able to find significance arising from variables assessed as repeated measures within-subjects (Furnham & Bradley, 1997; Geen, 1984; Standing et al., 1990). However, if the participant pool had been larger, we would have only included participants scoring in the extreme ends of the EPI to create dichotomized groups containing only highly introverted and highly extraverted participants. Future studies should pull from entire undergraduate populations to increase sample size and explore whether significant results are obtained when this procedure is replicated for extreme groups.

In conclusion, the present findings did not support our hypotheses. If future studies continue to obtain nonsignificant results, and Eysenck’s theory of extraversion and sensory thresholds does not appear to apply to visual stimulation, the theory may require revision. However, if more controlled experimental conditions and different research methodology are able to provide support for the idea that this theory can be applied to the visual senses as well, this would affirm the theory’s applicability and suggest that the sensory threshold differences seen to exist between introverts and extraverts extends to visual stimulation.

It is crucial that the hypotheses posited in the current study be revisited in future research to help clarify and refine the proposed theory between personality types and sensory thresholds, as well as help to inform policy efforts to manipulate distractions where they matter most: in vehicles, workplaces, schools, and other social settings. The more research that expands upon the relationship between individual differences in personality characteristics and power of sources of distraction, the more adept society will be at both identifying individuals most likely to be impacted by sources of distraction as well as understanding what types of stimulation can affect individuals most. Together, these benefits can contribute to the prevention of dangerous and frequently fatal consequences that often arise as a direct result of distraction while also informing efforts to curtail school and work environments to maximize success amongst heterogeneous groups of students and employees.

References


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