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RESEARCH ARTICLE

The Impact of Attention on Eyewitness Identification and Change Blindness

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The current study investigated whether differences exist in eyewitness identification and change blindness when manipulating attention. 126 undergraduate students were randomly assigned to either a full or divided attention group. Level of attention was found to be a significant predictor for accurate identification, χ^2 (3, N = 126) = 1947, p < .001. Additionally, there was a significant between-group difference on correct recall, t (115.46) = 4.24, p < .001, and self-reported confidence in responses given, t (124) = 3.62, p < .001. Level of attention was a non-significant predictor of participants' detection of change (two-tailed Fisher exact p = .058). Results indicate that level of attention impacts on accurate eyewitness identification.

Keywords: eyewitness identification; change blindness; attention; divided attention; recall

When viewing a face, the conditions of exposure are important. Thus, if exposure duration and viewing perspective are optimal, the face is more likely to be remembered than if conditions are poor (Fitzgerald, Oriet, & Price, 2011). In addition to the conditions, a number of other factors have been identified as crucial for assessing the accuracy of eyewitness identification. These factors can include the length of time the perpetrator is in the witness's line of sight, the amount of activity in a situation, and whether the culprit was wearing a disguise or carrying a weapon (Wells & Olson, 2003).

An analysis conducted by the US State Department in 1996 found that of the first 28 cases exonerated as a result of DNA evidence, 24 of these cases were convicted as a direct result of misidentification; in some cases this included multiple eyewitnesses misidentifying a suspect (Connors, Lundregan, Miller, & McEwan, 1996). Follow up analysis has shown similarly high rates of misidentification; in some instances it has accounted for 90% of wrongful convictions (Wells et al., 1998). In the case of *Neil v. Biggers* (1972), the United States Supreme Court identified five criteria to be examined when evaluating eyewitness identification, which became known as the "5 Biggers" criteria (Wells & Murray, 1983). One of the five criteria deemed to be important for identification purposes is the eyewitness's level of attention when witnessing an event.

Divided attention involves directing attention to a number of different stimuli at once (Goldstein, 2007). Divided attention has been shown to impact significantly on the way in which an individual attends to a situation and, as a result, stores memories relevant to that event (Pashler, 1999). There are two ways in which failure to detect a change in an event may result in misidentification: change blindness (CB) and unconscious transference (UT). CB is an individual's inability to detect changes that occur between two scenes (Simons & Rensink, 2005); the changes that occur can be large but, if unexpected, can and do go unnoticed. UT is deemed to occur when an eyewitness confuses a familiar but innocent individual with the perpetrator of the crime (Loftus, 1976).

Davis, Loftus, Vancous and Cucciare (2008) indicated that CB and UT can occur when errors in source monitoring happen due to disruptions in a scene, resulting in an eyewitness misremembering the original source of exposure. Ross, Ceci, Dunning and Toglia (1994) proposed a theory to explain why misidentification of a bystander, or UT, can occur and how this may contribute to CB. This theory posited that misidentifications are made when the witness believes that both the perpetrator and bystander are the same person. Thus, they are not looking for differences between the perpetrator and the bystander. Moreover, Mack and Rock (1998) suggested that what a retina views is different to how an individual perceives what they are seeing. This can lead to the misremembering of a scene or possible blindness to changes in our environment resulting in UT.

Existing research conducted on CB has shown that people can miss large changes in a scene, which can result in innocent individuals being misidentified as perpetrators (Davies & Hine, 2007; Davis et al., 2008). In studies examining CB, the majority of individuals, approximating 60% in many instances, did experience change blindness (Davies & Hine, 2007; Davis et al., 2008; Simons & Levin,

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1998). Simons, Chabris, Schnur and Levin (2002) found that when an individual experiences CB, the use of open questions does not induce memories for the pre-change scene. However, when very specific questions about the witnessed scene were asked, a memory for the pre-change scenario was elicited. Most, Scholl, Clifford and Simons (2005) used both shape and colour to examine implicit attention capture. Participants were asked to attend to one stimulus type in the study and while attending to this stimulus an unexpected event occurred on screen. Results indicated that the similarity of the unexpected event to the stimulus that participants were attending to impacted on detection. Additionally, Phillips, Geiselman, Haghighi and Lin (1997) found that memory blend impacts on the accuracy of an identification, such that if a bystander and perpetrator of a crime are present in a line-up, the bystander is more likely to be selected by participants than [the perpetrator?]. However, if the perpetrator is present in the line-up without the bystander, there is an increase in accurate identification.

Divided Attention

Lane (2006) and Zaragoza and Lane (1998) found that participants who experienced divided attention were more susceptible to suggestible information. Zaragoza and Lane (1998) examined divided attention by showing participants a slide show of an office theft and asking them to complete a post-event questionnaire. Whilst answering the quetionnaire, participants in the experimental condition were required to simultaneously listen to a series of music clips. To ensure divided attention, participants were not told the length of the music task, they were informed that it could end at any time, and that they would be required to identify the last two songs that had been played. Participants in the full attention condition completed these tasks separately. Results from this study indicated that those in the experimental condition were more likely to demonstrate an increase in false memories for suggested events.

Lane (2006) replicated Zaragoza and Lane's (1998) methodology to examine the effects of divided attention during the encoding of an event on participants' memory. Examining the encoding of a situation while experiencing divided attention is justifiable when considering the number of stimuli present in a situation. For instance, witnesses in real life paradigms are not always able to fully attend to a target situation because their attention is being focused on multiple stimuli. Overall, the results of this study indicated that disruption to a witness's attention during the encoding of an event does impact on participant's susceptibility to suggestibility. This is evidenced by the inclusion of false information during encoding and the resulting error in reporting the source of this information at testing.

Reinitz, Morrissey and Demb (1994) also indicated that participants level of attention impacted on facial encoding. Participants were shown composite faces in either a full or divided attention scenario. Results indicated that responses to "old" faces were significantly reduced when in the divided attention scenario. Thus, level of attention can impact on facial encoding and eyewitness identification.

Scholl, Noles, Pasheva and Sussman (2003) examined sustained inattentional blindness using cell phones as an attentional distractor. Participants were asked to complete a Multiple Object Tracking task across a number of trials. In one trial an unexpected event occurred; when probed about the event it was found that 30% of those with no distractor had failed to detect the unexpected event. Moreover, for those participants who had used a cellular telephone during the task, inattentional blindness increased to 90%. This is a further indication that when attention is divided, an individual's visual awareness of a scene is impaired.

Change Blindness

Nelson et al. (2011) used a two (CB or no CB) by two (crime severity: $5 or $500) design to determine whether crime severity impacted on either eyewitness identification or the detection of CB. Participants were randomly assigned to one of four conditions and shown a video depicting a crime. In the Nelson et al. (2011) study, the actor change always occurred after the theft whereas in Davies and Hine (2007), the change occurred before the theft. The rationale for the occurrence of the change after the theft was to determine whether the severity of the crime would result in increasing eyewitness attention for details of the crime. Using a computer monitor, a six-image photo line-up of the suspect, an innocent individual, and four foils was conducted. Nelson et al. (2011) found that crime severity did impact on accuracy of identification with those in the "no CB-$500" condition being more accurate than those in the "no CB-$5" condition. However, crime severity did not impact on the detection of change, with only 5% of participants assigned to the CB condition detecting the occurrence of change. This finding was much smaller than those found in previous research, which indicated that approximately 40% of participants in the CB condition detected the change (Davies & Hine, 2007; Davis et al., 2008; Simons & Levin, 1998). However, all of these studies do indicate the fallibility of eyewitness recall and the implications of this when subsequently asked to make an identification.

Davies and Hine (2007) examined the effects of incidental and intentional memory on eyewitness identification in a CB scenario. Participants were shown a video depicting a burglary; halfway through the video the identity of the burglar changed. Participants in the intentional condition were primed to pay attention to the video, while those in the incidental condition were not given any information. It was found that 39% of participants in the intentional condition detected the change and subsequently identified both suspects from the line-up. This indicates that participants who are primed to pay attention are more likely to detect the change and make a successful identification.

Photo Identification

In the United States, six or more images are used for photo identification, which must include a minimum of five filler images (Wisconsin Department of Justice Bureau of Training and standards for Criminal Justice, 2009).

Furthermore, the more images shown to a witness, the better the reliability of subsequent identifications (Wisconsin Department of Justice Bureau of Training and standards for Criminal Justice, 2009). Thompson, Zamojski and Colangelo (2010) examined whether the number of images shown to participants impacted on suspect selection by examining target and filler selection. Participants were shown a simulated crime and then asked to make an identification using a photo line-up of 3, 6 or 12 images on a computer screen. Participants were able to select suspects at a lower level of certainty by using the term "maybe". The results of this study suggested that the number of pictures used had a minimal effect on identification, with participants generally choosing a single image and 55% of participants correctly identifying the suspect. The results indicated that the lowest number of correct identifications stemmed from the 12-image presentation.

These findings are also consistent with research conducted by Stewart and McAllister (2001) who found that the size of the photo line-up does not have a significant impact on identification of a suspect. Cutler, Penrod and Martens (1987) examined eyewitness identification accuracy by manipulating a number of variables, including the use of a disguise or weapon, the length of exposure to the perpetrator and line-up instructions. Cutler et al. (1987) found that factors such as manipulated line-up instructions did impact on identifications. In addition, it was found that the duration of exposure to the perpetrator did not significantly impact on identification. Lindsay, Nosworthy, Martin and Martynuck (1994) also found that the use of biased procedures relating to line-up instructions resulted in increased false identifications. Dysart, Lindsay, Hammond and Dupuis (2001) used both photo-array and a live line up to determine possible biases that exist with identifications. The results suggested that if a witness selected a perpetrator from a photo-array and was then asked to participate in a live line up in which the selected perpetrator was present, they were likely to select this person again. Thus, indicating that the use of both live line-up and photo array can result in false identifications.

The Current Study

Previous research has provided evidence for the impact of divided attention on the accuracy of eyewitness identification and facial recognition as well as the impact of CB on eyewitness identification. However, an instance of these two elements being examined simultaneously when considering possible causal factors for misidentification has not previously been investigated. The aim of the present study is to examine the effects of divided attention on the detection of CB and subsequent identification.

Hypotheses

The hypotheses of the current study are as follows. Firstly, divided attention will impact on participant's ability to detect the change in the CB video when compared to those in the control condition. Secondly, divided attention will impact on participant's ability to successfully identify the perpetrator rather than the bystander or a foil. Thirdly, divided attention will impact on the accuracy of information recalled by participants and their confidence levels relating to the recalled information.

Method

Design

A two (full or divided attention) by four (perpetrator identification, bystander identification, foil or no identification made) between subjects chi-square design was used to examine the effects of attention on eyewitness identification. A separate two (full or divided attention) by two (CB detected or not detected) chi-square analysis was conducted on the data pertaining to CB. Participants were randomly assigned to one of two conditions: experimental (divided attention) or control (full attention). The independent variable (IV), attention (full or divided), was used to examine the dependent variables (DV): eyewitness identification selection, change blindness and information recall confidence levels.

Using G*Power computer software, a power analysis was conducted. This analysis indicated that for a medium effect size, with a significance level of .05, and a power of .8, a minimum sample size of 120 participants was required (Faul, Erdfelder, Lang, & Buchner, 2007).

Participants

One hundred and thirty undergraduate psychology students took part in this study and were recruited using SONA, the University's online research participation system. Each participant was awarded 2 credits for participation completion. Four participants did not complete all of the relevant sections and were removed prior to final analysis. Data from 126 participants (62 male, 64 female) were included, with a mean age of 21.22 years ($SD = 4.98$). Participants were randomly assigned to either the control ($n = 63$) or the experimental condition ($n = 63$) when viewing the simulated crime. A pilot study was conducted to ensure that participants were able to comprehend both the materials and procedures used. No changes were made to the study in accordance with the results of the pilot.

Participants viewed the same simulated crime, previously used by Nelson et al. (2011). This was shown in full screen on an Apple Macbook Pro laptop, in a darkened room in experimental laboratory conditions. The video shown was 1 minute 15 seconds in duration and depicted a student (the victim) sitting at a table studying; she places an envelope with $500 in a book and sets it on the table before leaving the room. Seconds after the victim leaves the room, the perpetrator enters the room. She takes a book from a bookshelf, turns to leave the room and notices the envelope left by the victim. The perpetrator picks up the envelope, removing the money and places the envelope back in the book. The perpetrator then leaves the room. When the perpetrator walks out of the room, a third girl (the bystander) is then seen carrying a book walking down a corridor.

An audio file consisting of popular music clips lasting 1 minute and 15 seconds in duration was also played to participants using AKG K530 High-Performance Headphones

(audio bandwidth of 17–26,500 Hz). These are an over-ear, headband style of headphone with soft ear padding that help to minimise extraneous noise. The music clips consisted of seven popular music songs and the length of the song played varied between 10 and 12 seconds; this was to prevent participants from anticipating when the music clip would change. All music clips included the title of the song in each segment of music played. The use of popular music for dividing attention has been used in previous studies and was found to successfully manipulate attention (Lane, 2006; Zaragoza & Lane, 1998).

In order to examine the manipulation of attention, a questionnaire listing 20 song titles alongside the artist name was administered to participants. The music listening questionnaire included all of the songs played in the audio segment alongside other popular music choices. A cued recall questionnaire that included 12 questions relating to specific content taken from the video clip was also administered to participants.

Four of the twelve questions asked for specific details such as: a description of the victim, how many people were in the video, a description of what the perpetrator was wearing and a description of the perpetrator. The relevance of these questions was to determine participant observations of the perpetrator prior to making their identification. Additionally, asking participants to specify how many people were in the video was indicative of whether participants had observed the occurrence of CB. A ten point Likert scale rating of each participants confidence level was used for each question (1 = not confident and 10 = very confident); if no selection was made this was taken to indicate zero confidence in their selection. Both questionnaires were created specifically for the current study.

After a period of 20 minutes, during which time participants were provided with a copy of National Geographic, twelve images were simultaneously presented to participants. Participants were asked to examine the pictures provided and, if able to, identify the individual they had seen committing the theft. A record of their selection and confidence level was then made on a sheet asking participants if they were able to make an identification and if so, to indicate their selection. A final questionnaire asked participants if they had noticed any abnormalities or oddities in the video they had watched and, if so, what they were. This also included a confidence scale. The purpose of the questionnaire was to determine if participants were aware of the change between perpetrator and bystander that had occurred in the video.

Coding

Each of the twelve questions in the initial questionnaire were based on cued recall; 59 items were coded in the video and 22 of these were relevant to the twelve questions asked. Nine of the questions in the questionnaire were coded as correct, somewhat correct, don't know or incorrect. Two questions were scored from 0 to 5 and these were pertinent to details relating to the victim and the description of the perpetrator. An additional question was coded 0 to 4 and this related to the clothing worn by the perpetrator.

Procedure

The current study received ethical approval from the National Univerisitsty of Ireland, Galway School of Psychology Ethics committee. Participants were provided with an information sheet to read and then asked to provide written consent and to complete a participant information sheet detailing age and gender. Each participant completed the study individually. Participants in the experimental condition were required to watch the video and simultaneously listen to a series of audio clips. Prior to watching the video and listening to the music, participants were informed that they would be required to concentrate on both the video and the music simultaneously as they would be asked a series of questions at a later point. Furthermore, to ensure that attention was divided, participants were informed that the music could stop at any time and that they would be asked to recall, in order, the last two songs that they had heard. Participants in the control condition watched the video and completed the music listening task separately and were then given the same instructions relevant to their condition.

After watching the video, participants completed two questionnaires. The first related to the music clips that had been heard and the second was a cued recall of the events they had witnessed. Upon completion of the two questionnaires, participants were provided with a magazine to read. The same National Geographic magazine was provided to all participants who completed the study. This magazine did not contain any images that would interfere with facial recognition.

The average time delay between watching the video and completing the identification process was 20 minutes. Participants were shown a hard copy photo line-up consisting of 12 images, including the perpetrator, the bystander and 10 never-before-seen individuals. The images were presented simultaneously and participants were informed that the perpetrator may or may not be present in the photo line-up and to take as long as they required before making their identification. Once participants were happy to proceed, they were instructed to complete the questionnaire relating to the identification. Upon completion of the identification process, participants were given a final sheet designed to determine whether they had noticed the change of the actors in the video.

Debriefing

At the conclusion of the study, participants were fully debriefed. As part of the debriefing process, participants were asked if they had ever heard of the phenomenon CB and, if so, what it was. Participants were then debriefed as to the purpose of the study and the deception used relating to CB. Participants were thanked for their participation and excused. The entire procedure took on average 35 minutes to complete per participant.

Results

Descriptive Statistics

Responses provided during cued recall were coded for correct and incorrect responses in order to determine whether or not the divided attention manipulation had

worked. Means and standard deviations for correct and incorrect responses alongside confidence scores are presented in **Table 1**.

Manipulation Check

An independent samples *t*-test was conducted to examine if differences existed between control and experimental groups on correct details recalled. The results showed that there was a significant difference in the number of correct responses between groups, $t(115.46) = 4.24$, $p < .001$, indicating that level of attention impacted on rate of accurate recall. Participants in the control condition remembered more accurate details than those in the experimental condition. **Figure 1** demonstrates the number of accurate scores for the full attention and divided attention groups.

A second independent samples *t*-test was conducted to examine if differences existed between the control group and experimental groups on a number of incorrect details recalled. The IV was condition (experimental and control) and the DV was total number of correct responses across cued questions. The results showed that there was a significant difference in the number of incorrect responses between groups, t (104.50) = –2.83, $p < .01$, indicating that level of attention impacted on participants rate of accurate recall. Participants in the experimental group recalled more incorrect details than controls. **Figure 2** demonstrates the number of incorrect scores for the experimental and control groups.

Confidence Levels

An independent samples *t*-test was conducted to examine if differences existed between the control and experimental groups on confidence levels of details correctly recalled. The IV was condition: experimental and control.

	Control		Experimental		
	M	***SD***	***M***	***SD***	***p***
Correct	12.79	2.38	10.68	3.15	< .001
Incorrect	2.89	1.57	3.94	2.49	.006
Confidence level	7.71	1.28	6.82	1.47	< .001

Table 1: Means (M) and standard deviations (SD) for correct and incorrect responses and confidence level across all participants.

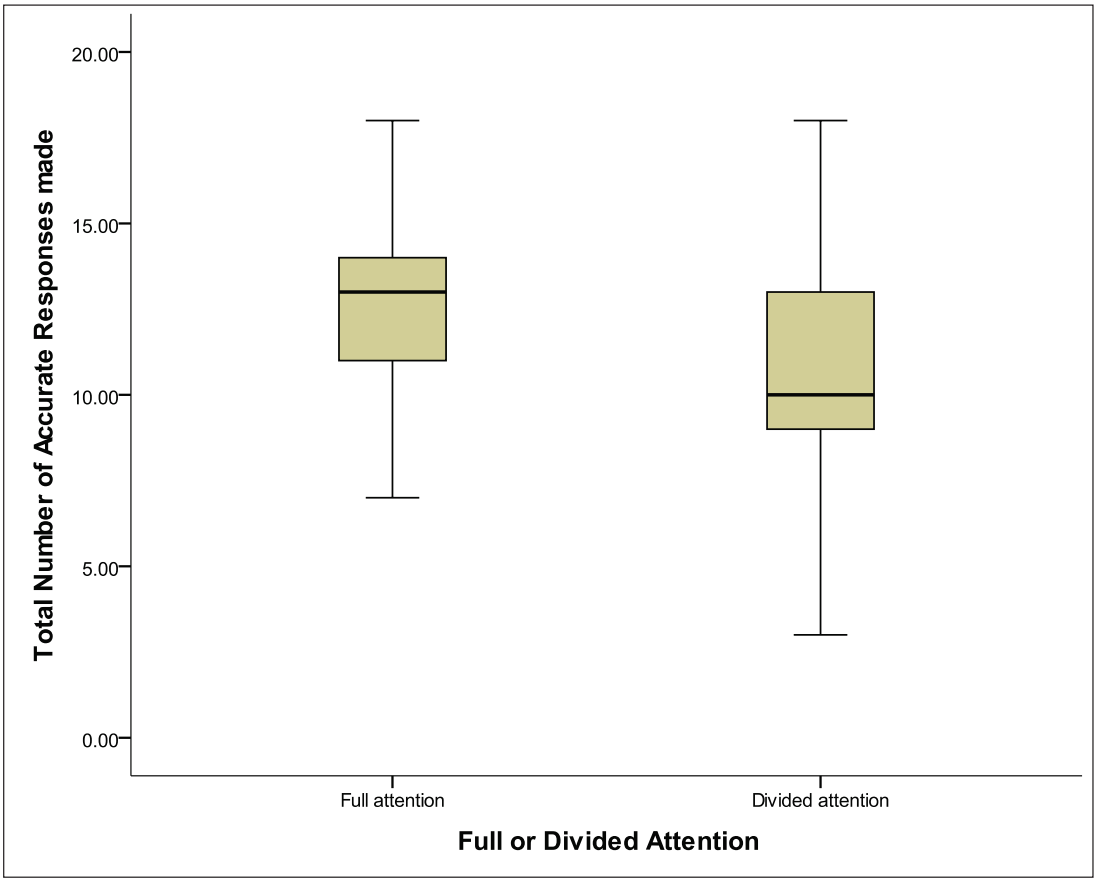

Figure 1: Correct scores between groups.

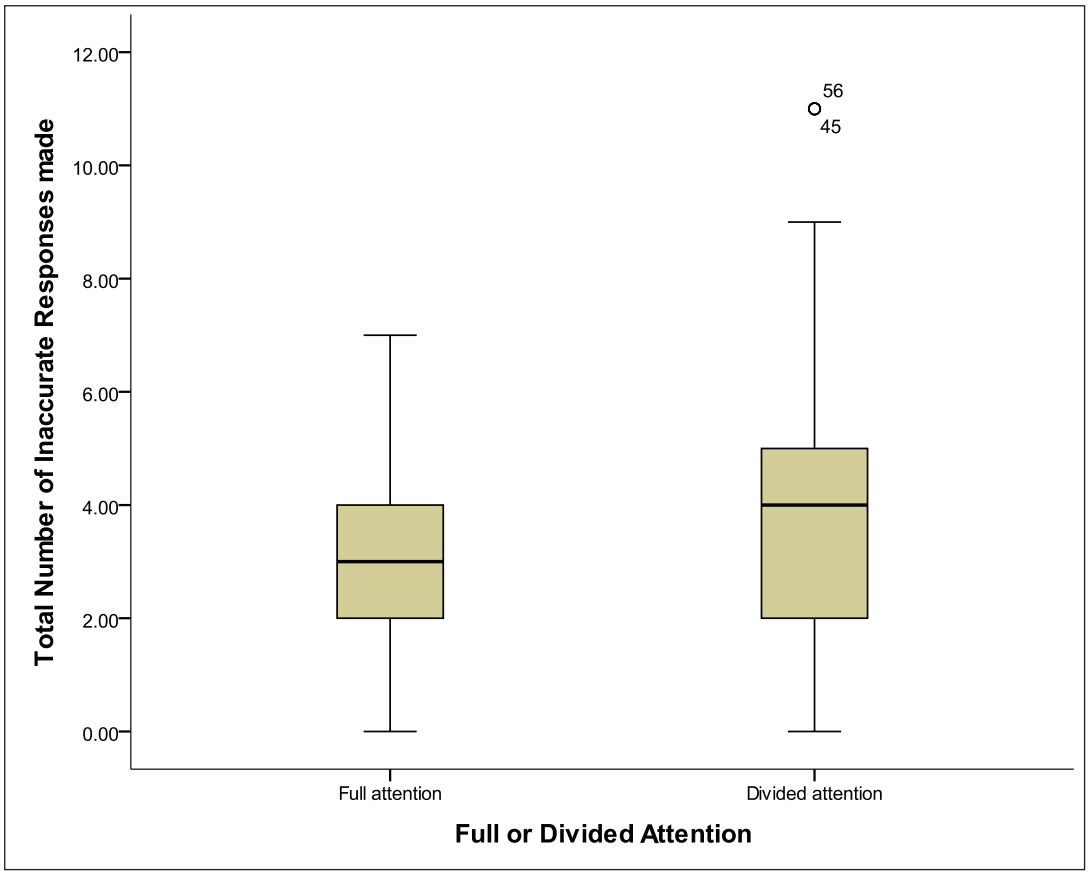

Figure 2: Incorrect scores between groups.

The DV was total confidence level across cued questions. An independent samples *t*-test indicated that there was a significant difference in confidence levels between groups, $t\,(124) = 3.62$, $p < .001$, signifying that level of attention impacted on confidence level for rate of accurate recall. Participants in the control condition indicated higher confidence levels than those in the experimental condition.

Eyewitness Identification

A chi-square analysis was conducted to determine whether there was an association between level of attention and eyewitness identification. The IV was condition: experimental or control. The DV was eyewitness identification (perpetrator, bystander, foil, no selection). **Table 2** shows the number of participants in each condition who made an identification, demonstrating a significant association between level of attention and accurate identification of the perpetrator. The results showed that there was a significant difference between the groups for identification, $\chi^2\,(3, N = 126) = 19.47$, $p < .001$. Cramér's V was .39, indicating a medium effect size (Cohen, 1992). Furthermore, those who detected the change within the study were more accurate in their idenfication, with all five participants correctly identifying the perpetrator.

Change Blindness

A chi-square analysis was conducted to determine whether there was an association between level of attention and CB. The IV was condition (experimental or control) and the DV was detection of CB (detected and not detected). A chi-square has an expected frequency of 5 (Miles & Banyard, 2007) and as this requirement was not met, Fisher's Exact Test is reported. The results of this test show that there was no significant relationship between attention and the detection of CB, $\chi^2\,(N = 126) = 5.03$, $p = .058$. Furthermore, awareness of the phenomenon of CB was limited. When debriefing at the end of the study participants were asked if they had ever heard of the CB phenomenon and, if so, what it entailed. From 126 participants, 3 had heard of the phenomenon but were unable to detail what it involved.

	Control	**Experimental**
	Full Attention (*n* = 63)	**Divided Attention (*n* = 63)**
Perpetrator	27 *17*	7 *17*
Bystander	8 *6.5*	5 *6.5*
Foil	23 *31*	39 *31*
No Selection	5 *8.5*	12 *8.5*

Table 2: Participant numbers per eyewitness identification category. *Expected values are displayed in italics.*

Discussion

The present study examined the impact that level of attention has on an eyewitness's ability, firstly, to detect the change between perpetrator and bystander; secondly, to accurately identfiy the perpetrator of the crime; and thirdly, to correctly recall information and have confidence in this information. Previous research has examined level of attention and CB separately within eyewitness identification research. To date, no research has explicitly examined the impact of both level of attention and CB on eyewitness identification to the best of the knowledge of the authors. There were two main hypotheses in this study, with the first being that divided attention would significantly impact on the ability to detect change in the CB video when compared to those in the control condition. The second hypothesis was that divided attention would impact on participant's ability to successfully identify the perpetrator rather than the bystander or foil.

Change Blindness Detection

The results of this study did not support the first hypothesis. Specifically, the rates of detection of CB were low, with 5 individuals (3.96% of the total sample) detecting the change, all of which had been assigned to the control condition (7.94% of those in the control condition detected change). Furthermore, of those who detected the change, all selected the perpetrator when making their identification and not the innocent bystander or foil. Rather, it was those individuals who did not detect the change who selected the innocent bystander. This highlights the fallibility of eyewitness identifications and the significant impact of an innocent bystander being identified as the perpetrator as a result of UT.

The findings of this study are consistent with the previous findings of Nelson et al. (2011) who found a 5% detection rate for CB. However, previous CB studies, such as those conducted by Davies and Hine (2007) and Davis et al. (2008), found a much higher rate of CB detection. Davies and Hine (2007) indicated a CB detection rate of 39%. Additionally, across three experiments, Davis et al. (2008) indicated identification rates of 40.4% in experiment one, 32.4% in experiment two, and 33% in experiment three. Perhaps the variance in the findings amongst these studies relates to the timing of when the change occurs. In the Davies and Hine (2007) study, the change occurred during the theft and in Davis et al. (2008) the change occurred before the theft. In both the Nelson et al. (2011) study and the current study, the change occurred after the theft. This may have resulted in participants attention being further impeded as they endeavored to remember as much salient information regarding the crime as possible, thus resulting in attention deviating from the content of the video.

Accurate Identification

The results of the study did support the second hypothesis, indicating that level of attention is a significant predictor of accurate identification. Overall, the results indicated 26.98% of the total sample identified the perpetrator as the culprit. Of those who selected the perpetrator, 79.41% of participants were from the control condition and 20.59% of participants were from the experimental condition. Additionally, of the overall sample, 10.32% identified the bystander as the perpetrator indicating that some level of UT may have occurred as a result of CB. Additionally, 49.21% identified a foil as the perpetrator, with 62.90% being from the experimental condition and 37.1% being from the control condition. However, it must be considered that due to the increased number of images used in this study for the photo-array, this may have led to the increased detection of a never before seen individual. In Nelson et al. (2011) accurate identification rates were higher for the no change condition (64%) than the change condition (36%). However, both conditions in this study experienced CB. Furthermore, those in the control condition who identified the perpetrator accounted for 42.86% of the sample, indicating a level of consistency with Nelson et al. (2011). Findings such as these have important implications for the reliability of eyewitness identification and for the number of images used in the process, as some countries' legislation stipulate the use of twelve images. For instance, legislation in the Republic of Ireland requires the use of twelve images when utilising a photo-array for identifications (Citizens Information, 2008).

Similar to Lane's (2006) findings, the results of this study indicate that participants experiencing divided attention are more vulnerable to suggestibility and this can impact on the misidentifications of innocent individuals when compared to those experiencing full attention. Additionally, Nelson et al. (2011) had participants complete three questionnaires pertaining to eyewitness testimony prior to completing a 2 minute free-recall task on the events they had witnessed in the video. However, the questionnaires used all related to eyewitness issues and thus may have prompted participants to remember the content of the video and as such, have an impact on the identification accuracy of participants. In the current study, due to the manipulation of divided attention, a cued recall questionnaire was developed and given to participants after they had viewed the video clip and completed the music listening task. The reasoning for this was that the main focus was on accurate identification and the detection of CB. Additionally, in order to determine whether or not the divided attention manipulation had worked, it was important to evaluate accuracy prior to the identification being made. Furthermore, during the time delay between viewing the crime and making the identification, participants were provided with a magazine unrelated to the study in any way. The use of a magazine acted as a control preventing cognitive overload, as may have been the case in previous research.

Accuracy and Confidence

The current study indicated that confidence ratings of participants did somewhat correspond to the accuracy of information provided at recall. Nelson et al., (2011) also indicated a similar finding in their study. However, research on confidence and accuracy that has been conducted in eyewitness identification literature does dictate caution as no strong correlation between these two factors

has been found, indicating that the link between accuracy and confidence is tenuous at best (Wells & Murray, 1984).

Limitations

There are a number of limitations within the present study that have been identified. Firstly, the current study was a laboratory based study and, while this is similar to many of the studies conducted on eyewitness testimony and identification, it significantly hampers the results in the sense that the way in which an individual reacts in a simulated task may not be the same reaction that would be elicited during the course of witnessing a real crime.

Furthermore, the questionnaire that participants were asked to complete was made up entirely of cued recall questions that may have prompted the responses of the participants. A mix of cued and free recall questions may have been a more appropriate method for determining accuracy of information and level of attention.

Additionally, the differences between the detection rates may be a result of either the quality of the video being poor or due to a similarity between the two actors. Both actors were a similar build and had the same colour of hair and this may have impacted on the rate of detection in the overall sample.

Future Research

Future research could expand on these findings through incorporating a vigilance test to ensure no signficant confounding factors exist between participants in either group. Additionally, a longer time delay between witnessing the crime and making the identification could be incorporated. Within a legal framework it is unlikely that a witness would be asked to make an identification minutes after witnessing a crime. Furthermore, a larger number of images could be incorporated into future research studies. In the current study 12 hard-copy images were used to form the photo line-up. However, additional images presented would provide higher ecological validity, as an individual is likely to view a series of images rather than a single set. Thus, the use of a larger sample of images would enhance the reliability and validity of the study design.

Conclusion

The current study highlights the impact that level of attention can have on eyewitness identification as well as examining the detection of CB. CB and, within that, UT are important phenomena that need to be examined in eyewitness identification literature. These phenomena could have significant implications for eyewitness misidentification as a result of a witness's inability to detect changes that may occur in a natural, ongoing event. Attention is not the only process that impacts on witnesses detection of a change. However, these results indicate that it may be a significant factor.

Additionally, the current study found that an individual's level of attention when witnessing a crime may impact significantly on eyewitness identification. This is not a new concept as the United States Supreme Court has previously indicated as part of the "5 Bigger's Criteria" the importance of attention (Wells & Murray, 1983). Rather, the current study provides one possible methodological approach for examining the resulting impact that divided attention can have on accurate eyewitness identification. Overall, research on divided attention has important ramifications in criminal trials where eyewitness credibility in identifying a perpetrator can heavily influence or sway the decision of both judge and jury.

Competing Interest

The authors declare that they have no competing interests.

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