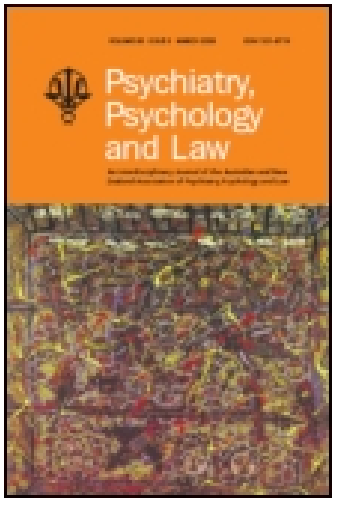

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Line-up Member Similarity Influences the Effectiveness of a Salient Rejection Option for Eyewitnesses

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Visually salient line-up rejection options have not been systematically studied with adult eyewitnesses. We explored the impact of using a non-verbal, salient rejection option on adults' identification accuracy for line-ups containing low- or high-similarity fillers. The non-verbal, salient rejection option had minimal impact on accuracy in low-similarity line-ups, but in high-similarity line-ups its inclusion increased correct rejections for target-absent line-ups as well as incorrect rejections in target-present line-ups, relative to a verbal rejection condition. The improved performance in target-absent line-ups suggests that adults, like children, may experience pressure to choose and guess during difficult tasks. This pressure is reduced when a prominent non-verbal rejection option is displayed in the line-up. However, the salient rejection option also appears to increase the attractiveness of avoiding a difficult choice between the target and highly similar fillers. Implications of these findings for the experimental literature and justice system are discussed.

Key words: eyewitness identification; line-up similarity; salient rejection option; wildcard.

Eyewitnesses have a demonstrated propensity for mistakenly identifying an innocent person from a line-up (Smith & Cutler, 2013). Misidentifications have the potential to implicate an innocent suspect of involvement in a crime and are a leading cause of false convictions (Connors, Lundregan, Miller, & McEwan, 1996; S.R. Gross & Shaffer, 2012; Wells et al., 1998). Although young children are particularly likely to identify an innocent person from target-absent line-ups (Davies, Stevenson-Robb, & Flin, 1988; Pozzulo & Lindsay, 1998), this problem is not exclusive to them; adult witnesses also demonstrate low correct rejection rates and a tendency to incorrectly identify innocent line-up members (Lindsay, Pozzulo, Craig, Lee, & Corber, 1997). Parker and Ryan (1993), for example, found that only 42% of adults in a target-absent condition correctly rejected the line-up. Because misidentifications can have such harmful implications, large bodies of research have focused on how to improve the accuracy of eyewitness identification by decreasing the identification of innocents. Although some strategies have been successful at reducing misidentifications (e.g., instructions about how the target may or may not be present; Steblay, 1997), there is still much room for improvement.

One method that has shown some success with child eyewitnesses is the inclusion of a visual image in the line-up representing the absence of the perpetrator and allowing children to reject the line-up through non-verbal means (Havard & Memon, 2012; Zajac & Karageorge, 2009). Children's poor performance on target-absent line-ups is believed to

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be related to a lack of awareness of rejection as an option and the guessing that stems from perceived pressure to make a selection from the line-up (J. Gross & Hayne, 1996; Lindsay et al., 1997). When the line-up contains a non-verbal rejection option that is displayed alongside the line-up members' photographs, children can choose a line-up member or they can choose the rejection option. Thus, the perceived pressure to choose need not result in a positive identification.

Adult and child witnesses who are informed that the culprit "may or may not be present" are less likely to misidentify an innocent line-up member, relative to witnesses who are not given such instructions (Keast, Brewer, & Wells, 2007; Steblay, 1997). This suggests that witnesses of all ages are susceptible to the implicit assumption that when a line-up member is present, a line-up member should be selected. The success of providing adults with a pre-line-up admonition suggests that they may also benefit from strategies to make the rejection option more salient and more similar to a line-up member selection. Salient rejection options in photoline-ups have been used with young adults (Leippe, Eisenstadt, & Rauch, 2009); however, the utility of such a method has not been systematically examined with an adult population. Thus, the present study extended the use of the salient rejection option to adults to examine the impact on identification accuracy.

Increasing the Saliency of Rejections

There have been several efforts to reduce misidentification by increasing the saliency of the rejection option for eyewitnesses. As mentioned above, a common strategy is to include verbal instructions that inform the witness that the person they saw committing the crime may or may not be present in the line-up. This method has been moderately effective at increasing accuracy with adults (Steblay, 1997). The second approach, which has received a fair amount of empirical attention with children, involves the use of visual cues to represent a rejection option that can be chosen in the same manner as a line-up member. Early on, Davies, Tarrant, and Flin (1989) included a line drawing (i.e., "Mr Nobody") in the line-up and Beal, Schmitt, and Dekle (1995; Experiment 1) used a card containing the words "not here"; both methods demonstrated some success in reducing false identifications in target-absent line-ups. A more recent method that has also shown success is the inclusion of a silhouette figure with a question mark (i.e., the wildcard; Zajac & Karageorge, 2009 and the mystery man; Havard & Memon, 2012). For example, Zajac and Karageorge (2009) were able to reduce inaccurate identifications by 25% in target-absent line-ups that contained the wildcard compared with a control condition, without impacting correct identifications in target-present line-ups. Likewise, Dunlevy and Cherryman (2013) used a similar approach and found that including a tree image in the line-up increased correct rejections and reduced incorrect filler identifications. Thus, the non-verbal rejection option has shown consistent, but modest, effectiveness with child witnesses. The reason for this success, as suggested by the research, is that a visual "not here" cue increases accuracy by allowing a witness to "choose" from a line-up in order to make a rejection decision (Havard, 2013) without any verbal effort (Zajac & Karageorge, 2009). That is, a primary utility of the visual "not here" cue is that it eliminates the need to verbally reject the line-up – rather, the witness can point to an item and still indicate the culprit is not present. The success of the wildcard and other similar procedures has led some researchers to routinely including such an option in their research with children (Pozzulo, Dempsey, Bruer, & Sheahan, 2012).

Although the practice is not as common, some researchers have used non-verbal, salient rejection techniques with adult populations. Pozzulo and colleagues (2012), for example, used a silhouette figure in their line-up with adult witnesses to indicate that the target may be absent from the line-up.

Similarly, other studies have included a "not here," "none of the above" or "I don't know" box in the line-up and on the witness response forms (Pozzulo & Dempsey, 2006). Despite its inclusion in some research, the effects of using a visual salient rejection option in the line-up with adult witnesses have not been systematically examined. It is possible that, like with child witnesses, providing adult witnesses with a visual representation of the absence of a perpetrator and eliminating the need to verbally reject the line-up will decrease misidentifications from target-absent line-ups without reducing accuracy in target-present line-ups. The evidence that the "may or may not be present" instruction has been moderately effective with adults (Steblay, 1997) suggests that there may be additional benefit to strengthening the instructions related to "not choosing." The salient rejection option may provide adults with the additional emphasis needed to reject target-absent line-ups.

Testing the applicability of salient rejection methods for all ages is important to promote consistency in eyewitness line-up procedures. As Pozzulo and colleagues (2008) argue, having different procedures for different age groups can be problematic. For example, having different procedures can result in confusion regarding when different procedures should be used (i.e., at what age does the "child" become old enough for an "adult" procedure?). A unified procedure is ideal because it would allow for easy and consistent training and use. Providing evidence on the utility of a salient rejection option with adults provides insight into how consistently this method can be applied and, thus, reduces potential concerns that can stem from recommending different procedures for different age groups.

Rejection Saliency and Line-up Composition

Eyewitness line-ups typically include a suspect (guilty or innocent) and fillers (known innocents; Wells & Turtle, 1986). The similarity between the suspect and fillers is a fundamental line-up construction issue. A recent meta-analysis showed that when suspect–filler similarity is low, witnesses are inclined to select the suspect regardless of whether that person is guilty or innocent (Fitzgerald, Price, Oriet, & Charman, 2013). Thus, line-ups containing dissimilar fillers can make the suspect's identity obvious. This was the approach taken by Zajac and colleagues (Karageorge & Zajac, 2011; Zajac & Karageorge, 2009), who tested the wildcard exclusively on biased line-ups to demonstrate the utility of the visual rejection option in the "worst case scenario." Although the wildcard was effective under those circumstances, it is unclear whether their findings would generalize to line-ups that contain fillers that resemble the suspect.

The difficulty of a target-present line-up task is largely a product of line-up member similarity. Compared with low-similarity line-ups, witnesses are less likely to correctly identify a target from moderate or high-similarity line-ups (Fitzgerald et al., 2013). From these data, we can infer that if the person who committed the crime is in a line-up with dissimilar fillers, the witness has a relatively easy identification task. Any witness with a reasonable memory of the culprit can be expected to consider the culprit's photograph to be a much better match than any of the other photographs to their memory of the culprit. In this situation, the discrepancy between the strong feeling of familiarity of the culprit's photograph and the weak feeling of familiarity for all the fillers should render the rejection option to be an undesirable option, regardless of its salience.

We are particularly interested in the effect of a salient, non-verbal rejection option on responses to line-ups containing the target and a set of highly similar fillers. Such a line-up presents a more demanding identification task in which the witness must decide from among several members who match their memory of the culprit to some extent. By contrast to the low-similarity line-up, the

witness may only detect a small discrepancy in the feeling of familiarity between the target and the highly similar fillers. The strong competition of the highly plausible fillers can be expected to reduce the witnesses' confidence in whether the target or any of the line-up members is the person they are attempting to identify. In this situation, the presence of a salient, non-verbal rejection option could encourage witnesses to reject the line-up rather than choose from among a set of similar-looking line-up members.

Present Study

Following Zajac and Karageorge (2009), we were interested in examining the difference between verbal (control) and non-verbal (salient) rejection techniques. Thus, we examined the use of a visual image in the line-up as a method to reduce false identifications in adult witnesses by providing a salient, non-verbal selection option. Our second objective was to understand how the similarity of the fillers to the target influences the utility of this method. Examining a visual rejection option with similar fillers is important to establish ecological validity of this line-up technique, as recent surveys have revealed that police officers typically match fillers to the suspect's appearance (Police Executive Research Forum, 2013). In order for the present study to address this issue and remain comparable with Zajac and Karageorge's (2009) "worst case scenario" design, we also included line-ups containing dissimilar fillers.

Consistent with previous research with children (Zajac & Karageorge, 2009), we hypothesized that the presence of a salient rejection option would increase accuracy when the task was easy (i.e., lower similarity line-up). However, given the increased difficulty in correctly identifying a target from line-ups containing high- relative to low-similarity fillers, Fitzgerald et al., 2013), we hypothesized that highly similar fillers would result in an increased tendency to select the salient non-verbal rejection option as an easy "way out." We hypothesized that perceived line-up difficulty would be unaffected by the presence of the target and that the salient, non-verbal rejection option would increase target-absent and target-present line-up rejections when fillers were similar to the target. As a consequence of the increased attractiveness of the rejection option, we predicted that highly similar fillers combined with a salient, non-verbal rejection option would increase correct rejections from target-absent line-ups and decrease correct identifications from target-present line-ups.

Method

Participants

We recruited 310 undergraduate students (M_{age} = 21.4, SD = 5.0; 77% women; 79% White)[1] from a psychology department participant pool. All participants received partial course credit as compensation.

Design

Participants were randomly assigned to one of eight conditions in a 2 (Rejection Option: Non-verbal [Salient] vs Verbal [Control]) × 2 (Similarity: Lower vs Higher) × 2 (Target: Present vs Absent) between-subjects design.

Materials

Target Event Video

Participants viewed a brief video depicting a workplace theft. The video began with a young woman entering a kitchen and placing a brown paper bag labelled "Sally" into a refrigerator. Shortly after Sally exited the kitchen, a man entered and opened the refrigerator. Upon spotting Sally's lunch, the man took it and exited the scene. The thief was in view for 16 seconds.

Line-ups

All line-ups contained six line-up members, who were presented simultaneously in 2 × 3

array. Prior to constructing the line-ups, we collected similarity ratings from judges who were otherwise independent from the main experiment. These judges ($n = 22$) provided pairwise similarity ratings between photographs of the thief and 277 potential fillers on an 11-point Likert scale (0 = not at all similar, 10 = highly similar). Mean ratings for the set ranged from 0.75 to 6.00 ($M = 3.02$, $SD = 1.00$).

Similarity Manipulation

We used the similarity ratings to construct line-ups that varied in the extent to which fillers resembled the thief. Fillers were rated as less similar to the thief in the lower similarity condition ($M = 2.63$) than in the higher similarity condition ($M = 5.40$).

Target Presence Manipulation

Target-present line-ups contained the thief from the video and five fillers. In target-absent line-ups, the thief was replaced with a similar-looking innocent suspect (similarity rating: $M = 4.92$). The spatial position of the suspect was fully counterbalanced across participants.

Rejection Option Manipulation

In the non-verbal (salient) condition, a blank silhouette figure (the wildcard; Zajac & Karageorge, 2009) was located in the middle of the line-up, between the two rows of line-ups members. In the verbal (control) condition, the blank silhouette figure was absent.

Procedure

The study was advertised as an investigation of event impressions. The consent form explained that participants would watch and discuss a video. Participants viewed the target event video in an individual testing room. After watching the video, participants completed a 20-minute distracter task (rating the similarity between pairs of women's faces). Participants then reported everything they could remember from the video. The experimenter subsequently explained that she was interested in whether they could identify the thief from a line-up.

A computer program was used to administer the line-up. The experimenter who launched the computer program did not know which line-up would be administered (i.e., double-blind). Before presenting the line-up, the computer program instructed participants that the thief may or may not be present in the line-up (i.e., non-biased instructions). Prior to displaying the line-up, the computer program explained the response options that would be available. In the non-verbal (salient) condition, participants could press a number from "1" to "6" to select a line-up member or they could press the number "0" to select the "wildcard'. In the verbal (control) condition, participants could press a number from "1" to "6" to select a line-up member or they could verbally instruct the experimenter that the thief was absent. The difference in these two rejection techniques (verbal and non-verbal) were employed to be comparable with the verbal versus non-verbal procedures used by Zajac and Karageorge (2009). In both conditions, the options for selecting a line-up member or rejecting the line-up were reiterated at the top of the screen that displayed the line-up.

Results

Line-up Identification Choice

To begin our analyses, we conducted a hierarchical log-linear analysis (HILOG) that included our three manipulated variables and identification response as the dependent variable. The 2 (Similarity: Lower, Higher) × 2 (Rejection Manipulation: Verbal [Control], Non-verbal [Salient]) × 2 (Target: Absent, Present) × 3 (Line-up Response: Suspect, Filler, Reject) HILOG revealed no significant four- or three-way interactions. The highest

Table 1. Identification response rates

Target	Rejection option	Similarity	*n*	Response		
				Suspect	Filler	Rejection
Absent	Non-verbal (Salient)	Low	39	.03	.10	.87
		High	40	.05	.23	.73
	Verbal (Control)	Low	39	.10	.13	.77
		High	38	.05	.50	.45
Present	Non-verbal (Salient)	Low	39	.82	.05	.13
		High	39	.41	.15	.44
	Verbal (Control)	Low	39	.77	.10	.13
		High	37	.65	.22	.14

order interaction was a two-way effect. Partial association analyses indicated each of the three manipulated variables influenced line-up response (see Table 1). The effect of target presence, $\chi^2(2) = 146.53$, $p < .001$, was driven by high suspect identification rates when the target was present and high rejection rates when the target was absent. This shows that witnesses generally had a good memory of the target. The effect of similarity, $\chi^2(2) = 21.42$, $p < .001$, was driven by a general pattern of higher suspect identification rates and lower filler identification rates in the lower relative to higher similarity line-ups. The effect of rejection manipulation, $\chi^2(2) = 12.37$, $p = .002$, was driven by higher rejection rates in the non-verbal (salient) condition than in the verbal (control) condition. The absence of a three-way interaction between target presence, rejection manipulation, and line-up response is noteworthy because it shows that the non-verbal rejection option increased line-up rejections in both target-present (28% vs 13%) and target-absent (80% vs 61%) line-ups. We examined these effects further with tests of simple effects in target-absent and target-present line-ups.

Target-Absent

When the target was absent, the non-verbal (salient) rejection option generally worked as intended. Specifically, witnesses made more correct rejections in the non-verbal condition (80%) than in the verbal (control) condition (61%), $z = 2.59$, $p = .009$, $h = .42$. Although the rejection manipulation did not affect innocent suspect misidentifications, more fillers were incorrectly identified in the verbal (31%) than the non-verbal condition (17%), $z = 2.17$, $p = .03$, $h = .33$. Therefore, the use of the non-verbal (salient) rejection option improved accuracy in target-absent line-ups.

Similarity also affected accuracy. Although similarity had no effect on innocent suspect misidentifications, witnesses correctly rejected more low-similarity line-ups (82%) than high-similarity line-ups (59%), $z = 3.23$, $p = .001$, $h = .51$, and incorrectly identified more high-similarity fillers (36%) than low-similarity fillers (12%), $z = 3.72$, $p < .001$, $h = .57$. Thus, witnesses were less accurate when the fillers closely resembled the target.

Although innocent suspect selections were generally unaffected by any of the manipulations, the rejection manipulation's effect on filler identifications and line-up rejections depended on similarity (Table 1). In high-similarity line-ups, including the non-verbal rejection option led to a 28% increase in correct rejections, $z = 2.58$, $p = .005$, $h = .58$, and a 27% decrease in filler selections, $z = 2.54$, $p = .01$, $h = .57$. By contrast, in low-similarity line-ups, including

the non-verbal rejection led to only a 10% increase in the correct rejection rate and only a 3% decrease in filler selections (both non-significant differences). Thus, the non-verbal (salient) condition only had a substantial benefit when similarity was high.

Target-Present

Consistent with target-absent line-ups, we observed a higher incorrect rejection rate in the non-verbal (salient) condition (28%) than in the verbal (control) condition (13%), $z = 2.45$, $p = .01$, $h = .38$. Target and filler identification rates were higher in the verbal condition than in the non-verbal condition; however, neither of these differences was significant.

Also consistent with target-absent line-ups, higher similarity was associated with lower accuracy. Correct identification rates were higher in the low-similarity condition (80%) than in the high-similarity condition (53%), $z = 3.68$, $p < .001$, $h = .53$. In addition, more rejections were made in the high-similarity condition (29%) than in the low-similarity condition (13%), $z = 2.49$, $p = .01$, $h = .42$ and more fillers were identified the high-similarity condition (18%) than in the low-similarity condition (8%), $z = 2.00$, $p = .05$, $h = .32$. This suggests that when the fillers closely resemble the guilty suspect, witnesses have more difficulty identifying the guilty suspect and, instead, incorrectly identify fillers or reject the line-up.

Although filler selections were generally unaffected by any of the manipulations, the rejection manipulation's effect on target identifications and line-up rejections depended on similarity (Table 1). When similarity was high, including the non-verbal rejection option led to a 24% reduction in correct identifications, $z = 2.13$, $p = .02$, $h = .48$, and a 31% increase in incorrect rejections, $z = 3.03$, $p = .001$, $h = .68$. By contrast, in the lower similarity condition, including the non-verbal rejection had no effect on correct identifications or incorrect rejections. Thus, the non-verbal (salient) rejection option had no consequence in the lower similarity condition and was detrimental in the higher similarity condition.

Discussion

Our justification for exploring a non-verbal, salient rejection option with an adult population was threefold. First, like children, adults frequently misidentify innocent line-up members (Parker & Ryan, 1993). Second, although researchers have used salient, non-verbal rejection options with adult populations (Pozzulo et al., 2012), the utility of such methods has not been systematically examined with adults. Third, such exploration provides insight into how consistently this method can be applied in the justice system to potentially alleviate issues pertaining to different methods for different ages.

Consistent with previous research on child witnesses (Zajac & Karageorge, 2009), the use of a non-verbal, salient rejection option increased correct rejection rates when the target was absent. However, in contrast to Zajac and Karageorge's (2009) findings that the wildcard had no negative impact on children's correct identification rates, the salient rejection option increased rejection rates when the target was present, thereby reducing accuracy. These effects were dependent on how closely the fillers resembled the guilty suspect. In the low-similarity line-ups, the salient rejection option had no strong impact on identification responses. In the high-similarity line-ups, the wildcard produced the same advantages with adults that have been found with children. That is, 28% more correct rejections were made in the salient (non-verbal) than the control (verbal) condition when the target was absent. However, as expected, these advantages also came at a cost; witnesses were also 30% more likely to incorrectly reject a line-up when target was present. These effects are comparable with some research on rejection instructions. Clark (2012), for example, found that line-up

instructions increased accuracy in target-absent line-ups and decreased accuracy in target-present line-ups.

The use of a non-verbal, salient rejection option was designed to help children overcome social pressure to choose from a line-up (Havard & Memon, 2012; Zajac & Karageorge, 2009). However, some researchers argue that young adults do not require the same level of assistance as they take greater caution from verbal instructions than children (Beal et al., 1995). The results of the present study suggest that the use of a non-verbal, salient rejection option is no more advantageous for adults than asking them to rejection the line-up verbally. This may be due to adults being able to retain and take greater caution from explicit, verbal rejection instructions than children (Beal et al., 1995) and that further reinforcing the rejection option using a visual image may make the rejection option too attractive for adults, particularly if the task is challenging.

Practical Applications

Although having one procedure for all eyewitnesses is ideal for practical reasons (Pozzulo et al., 2008), the present study suggests the cost of using a salient rejection option with adult eyewitnesses outweighs any benefits. In fact, there are clear harmful effects of using the wildcard as evidenced by a reduction in guilty suspect identifications with no decrease in innocent suspect identifications with the wildcard. At first glance, the wildcard appears to have potential usefulness as it increases correct rejections via reducing filler identifications when the target was absent. However, its failure to reduce innocent suspect identifications or increase guilty suspect identifications is evident of the harmful effects of using non-verbal, salient rejection option with adults. The importance of these findings for researchers is clear: previous studies that have employed a salient rejection option with adults may have inadvertently reduced eyewitnesses' performance in target-present line-ups – particularly if they used unbiased line-ups with highly similar fillers. However, the implications of this research for the justice system are more dramatic. Unlike in experimental settings, investigators do not know whether the suspect in a line-up is guilty or innocent. When the line-up contains the guilty perpetrator and highly similar fillers, using the salient rejection option may increase errors that, in turn, reduce the investigative utility of the eyewitness evidence. When the guilty perpetrator is not in the line-up, the rejection option has no impact on the reduction of misidentifications.

Directions for Future Research

There are at least two possible mechanisms by which our rejection manipulation could be affecting identification responses. The visual rejection option may encourage line-up rejections because of increased saliency and heightened awareness of the option to reject. Alternatively, the visual rejection option may encourage line-up rejections because witnesses can "choose" to reject the line-up in the same manner as they can choose to select a line-up member and, thus, the pressure to choose can result in either a positive or a negative identification decision. Although rejection options have been manipulated in numerous studies (Beal et al., 1995; Davies et al., 1989; Dunlevy & Cherryman, 2013; Havard & Memon, 2012; Karageorge & Zajac, 2011; Zajac & Karageorge, 2009), neither the present study nor any previous study has been designed in such a way that would allow for the relative contributions of these two potential mechanisms to be disentangled. We suspect that in the present research, it was the increased saliency of the rejection option that caused the visual rejection option to become particularly attractive when the difficulty of the identification was increased by the inclusion of highly similar fillers. Therefore, a rejection option that permits witnesses to reject the line-up non-verbally without affecting salience could produce different

results than we obtained. In any event, isolating the effects of non-verbal and salient rejection options would be a promising area of future research. One way to isolate these mechanisms may by through expanding the types of visual rejection options used in research.

Going forward, it will be important to further exami ne the efficacy of salient rejection options with variable line-up types and innovative salient rejection options. It is possible that the limitations of the salient rejection option are the result of the type of salient option used (i.e., the wildcard), so additional research is necessary to examine whether other methods of offering salient rejection options result in similar findings. In addition, applying the present design to child eyewitness population will supplement Zajac and Karageorge's (2009; Karageorge & Zajac, 2011) findings and examine if using a salient rejection option with an unbiased line-up results in the same benefits as seen with a biased line-up.

Note

1. Because of experimenter error, demographic information for 34 participants was not obtained.

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