

## **Suggestiveness in Photospread Line-ups: Similarity Induces Distinctiveness**

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### SUMMARY

The present research examined whether line-ups based on target ('suspect') face similarity are biased or suggestive. Four experiments are described in which subjects constructed photographic line-ups by selecting foils similar in appearance to a target. Later, another group of subjects who had not seen the faces before (mock witnesses) were asked to pick out the targets from the line-ups. All four experiments showed that mock witnesses selected the target significantly more often than expected by chance, thereby demonstrating suggestiveness. Three alternative line-up construction methods were also evaluated. In these methods, foil selection was based not only on target similarity but also on similarity with one or more of the other line-up faces. Results showed that alternative line-up targets were not selected significantly more often than chance, suggesting that bias was reduced. An overall analysis showed that the alternative line-ups were significantly less suggestive than target-based line-ups. The results indicate that foil selection procedures that incorporate foil-to-foil similarity produce fairer line-ups than those exclusively based on target similarity.

Eyewitness identification is an important part of many criminal investigations. In some cases, such as assault and rape, it may be the only direct evidence available (Malpass and Devine, 1984). One method of identification is the line-up or identity parade. Line-ups usually present several persons known to be innocent (distractors or foils) plus the suspected offender. The purpose of live line-ups (or the picture version, photospreads) is to allow the witness to identify the person they saw under conditions that avoid the selection of an innocent suspect.

Protection of the innocent suspect is usually afforded by a fair line-up. A fair line-up presents the suspect in a manner in which he/she is not conspicuous relative to the other members of the line-up. Suggestive line-ups provide cues that unfairly

inform the identity of the suspect. Wall (1965) ascribes the influence of suggestion as accounting for more miscarriages of justice than any other factor involved in eyewitness identification cases. If suggestion was not considered a problem then a show-up, where the suspect is presented alone to witnesses, would be sufficient. Theoretically, line-ups are more fair than show-ups because the probability of choosing an innocent suspect is distributed across several faces of a line-up.

The need for fair line-ups is particularly important in cases where witnesses may feel obligated to make an identification for reasons that are extraneous to facial recognition. For example, when confronted with authority figures, witnesses may be anxious to comply with police demands. Doob and Kirshenbaum (1973) suggest that the witness may take a role analogous to the 'good' subjects in psychological experiments (Orne, 1962). 'Good' subjects seek cues from the experimental situation to provide direction on how to behave properly, and in particular, how to behave in ways they think will help to support the experimenter's hypothesis. Correspondingly, witnesses may surmise that the police believe the suspect is guilty and will be disappointed or annoyed if an identification is not made. Thus, the witness may feel pressure to make a selection because a 'correct' identification would help corroborate police suspicions. If the offender is absent (i.e. the police suspect is not the offender), identification would produce wrongful incrimination and might lead to false conviction. Fair line-up identification procedures reduce the likelihood that innocent suspects will be selected by witnesses inclined to make a choice.

Line-up fairness cannot be assessed using actual eyewitnesses because one cannot separate how much of their performance was due to recollection of the offender and how much was due to line-up suggestiveness. Suggestiveness can be assessed by measuring the base rate selections of non-eyewitnesses (mock witnesses). If the suspect is selected (guessed) by mock witnesses more often than other members of the line-up, then the line-up's physical construction is suggestive with respect to the suspect. More formally, a line-up is biased when mock witnesses select the suspect more often (or less often) than expected by chance. Chance is defined as  $1/n$ , where  $n$  is the number of people in the line-up (Doob and Kirshenbaum, 1973). For example, in a fair six-person line-up the proportion of mock witnesses choosing the suspect should equal .167 (1/6). Fairness decreases as actual selection departs substantially from this value.

To avoid bias, police may use a construction procedure that selects non-suspect line-up members who appear similar to the suspect. Malpass and Devine (1983) reported that the criterion of similarity appears in all of the line-up construction guidelines that they reviewed. Usually, these guidelines recommend that the foils be about the same age, height, build, race, have the same hair length, hair colour, and be similar in general demeanour and position in life as the suspect. This guideline has not always been followed, however. Buckhout (1977) describes a police line-up in which a black suspect was placed in a line-up with five white foils. Several cases of suggestive line-ups have been cited by the United States Supreme Court. In one notorious case, *United States v. Wade* (1967) the suspect was known to be a young man but the line-up consisted of several men over 40 years of age and one teenager (the suspect). In another case, a male Oriental suspect was placed in a line-up in which he was the only person of Asian descent.

These cases illustrate that the line-up is regarded as unfair if the suspect is not similar to the other line-up members. In these examples the suspects were so distinctive that witnesses were essentially presented with line-ups with only one real choice, not unlike show-ups.

The logic of using foils similar to the police suspect is that eyewitnesses who possess good information about the offender's individual and unique appearance should be able to distinguish between the offender (should he or she be present) and other line-up members who possess the same general characteristics. Without knowledge of the offender's unique appearance, non eye-witnesses should only be able to select the suspect with a probability equal to chance. As Shepherd, Ellis, and Davies (1982) pointed out, the similarity criterion taken to its extreme would make the distractor members identical to the suspect. Even if such a line-up could be constructed (e.g. with multiple photographs of the target), it would be biased because it is nothing more than a show-up—the same person is just shown a number of times. However, in another respect this line-up is extremely fair, because selection should be distributed equally among the line-up members (except for possible position preferences). Obviously, the absurdity of the identical person line-up is illustrative of one pitfall of a strict similarity criterion.

Recent research also casts a shadow on the similarity criterion (Laughery, Jensen, and Wogalter, 1988; Wogalter and Jensen, 1986). In one experiment reported by Laughery *et al.* (1988), face stimuli were assembled by random selection of feature exemplars using a computer-assisted face composite system (Mac-a-Mug Pro). Line-ups were constructed by first generating a target ('suspect') face for each line-up, followed by a set of five distractor faces each differing from the target face by one feature (e.g. one having a different nose, another a different mouth, etc.). Thus, the line-ups were constructed so that the target was more similar to the distractors than the distractors were to each other (the distractors differed among themselves by two features).

Laughery *et al.* gave these line-ups to a group of subjects after they had been exposed to a large number of (irrelevant) face photographs. They ranked each face in the line-ups as to the likelihood of it being one of the faces that they had seen before. Unbeknownst to the subjects, none of the faces in the line-ups had been shown earlier (since the line-up faces were composed of randomly selected feature exemplars). Therefore, the scores of the faces should have been no different from a value expected by chance. However, Laughery *et al.* found that the targets were judged as significantly more familiar (as having been seen in the initial phase) than chance would predict. This research shows that line-ups based solely on the similarity of the foils to the suspect make the suspect stand out in a way not usually ascribed to distinctiveness. The suspect stands out because it is the most similar face in the line-up. Thus, selecting foils similar to the target in order to avoid distinctiveness, paradoxically, also produces another form of distinctiveness.

Although the logic and method of Wogalter and Jensen (1986) and Laughery *et al.* (1988) is internally valid, this research might be questioned in terms of external validity. The distractor faces were constructed so that each distractor member differed by only one feature from the target. This produces a line-up unlike any that would occur in a real-life situation (i.e. it is very unlikely that police would find persons that differed by so few features). Therefore, we do not know whether the bias reported by Wogalter and Jensen (1986) and Laughery *et al.* (1988) would hold in more

realistic line-ups, where many more facial features vary even among very similar appearing faces.

## PRESENT RESEARCH

The present research attempts to validate the similarity bias effect found by Wogalter and Jensen (1986) and Laughery *et al.* (1988) by incorporating more realistic stimuli and procedures. In four experiments, groups of subjects constructed photographic line-ups by choosing foils similar to targets (target-based method). Later, other subjects (mock witnesses) were shown the line-ups and tried to guess the targets.

Experiments 2-4 explored an additional issue. How might one construct an unbiased line-up? Three alternative methods were examined in which foil selection was based not only on their similarity to the target, but also on their similarity to other members of the line-up. It was expected that line-ups constructed in this way would make the target less prototypical (relative to the rest of the line-up) by distributing similarity among the line-up members.

The procedure of all four experiments involved three phases: stimulus preparation, construction, and presentation. In the stimulus preparation phase, sets of targets and potential foil faces were assembled. In the construction phase, pairs of subjects constructed the line-ups. In the presentation phase the line-ups were given to another group of subjects who attempted to guess the targets in the line-ups.

## EXPERIMENT 1

The purpose of Experiment 1 was to establish whether the similarity-bias effect reported by Wogalter and Jensen (1986) and Laughery *et al.* (1988) could be extended to line-ups using photographs of real faces and using a construction procedure in which subjects selected the line-up foils based on target similarity.

### Method

#### *Subjects*

Ten University of Richmond undergraduates constructed line-ups. Later 82 additional University of Richmond undergraduates participated in small groups in the presentation phase. Subjects participated for introductory psychology course credit.

#### *Stimulus materials*

In the stimulus preparation phase, approximately 400 photographs (5.7 × 4.4 cm) of white male senior students from the 1978 to 1980 University of Richmond year-books were cut into individual pictures. The pictures were homogeneous in that all were front-portrait (slightly angled) views and all persons wore similar clothing (dark coat and tie). Ten faces were randomly selected to serve as targets. The remaining pool was sorted into 10 piles to produce sets of 25 faces based on general similarity to the targets. This preliminary resemblance decision was made by the experimenters primarily based on hair and face shape. The main purpose of this procedure was

to withhold implausible foils from the contents of the sets (i.e. a brunette, curly-haired, thin-faced foil was not grouped with a blond straight-haired, broad-faced target). A secondary purpose was to limit the faces considered by construction subjects to a workable number.

#### *Procedure*

In the construction phase, subjects worked in pairs to construct line-ups. They were given two envelopes and instructions to assemble two six-person line-ups. They were told to construct line-ups by first selecting the most similar face to the target, then the next most similar, and so on until they had selected the five most similar faces to the target. When subjects finished the first line-up, the instructions were repeated for the second line-up. Pictures from each completed line-up were then affixed in a random order to the inside of manila folders.

In the presentation phase, different subjects participated in small groups of two to six and were given the line-up folders. They were told that a 'police suspect' would be present in each line-up and that the line-ups were assembled based on the suspects' appearance. Subjects were told to study each line-up carefully and to choose the face that they thought was the suspect. They were told to ignore facial expression and 'guilty' appearances, and to make a choice for every line-up. Small stacks of line-up folders were randomly distributed to participants who examined different line-ups at the same time. After making judgments for the line-ups they received, subjects handed them back to the experimenter and they were redistributed to another participant. This procedure continued until all of the line-ups were completed. Subjects marked their choices on a response sheet with numbered blanks corresponding to the face order in the folders. Subjects were not given feedback as to the correctness of their choices.

#### **Results and discussion**

Target faces were given scores of 1 when selected by subjects and scores of 0 if any of the five distractors were selected. Target selection was compared to what would be expected by random/chance selection. If the subjects were merely selecting faces at random, the rate of target selection would be one out of six or a mean of .167. Selection rates above this level would indicate the line-ups are biased ( $M = .224$ ,  $SD = .171$ ) were selected significantly more often than would be expected by chance,  $t(81) = 2.92$ ,  $p < .01$ , showing that this construction method produced biased line-ups. It also confirms the findings of Wogalter and Jensen (1986) and Laughery *et al.* (1988) who found a similar effect using composite face stimuli differing by minor feature changes. The effect size in the current experiment (.31) was smaller than in the earlier studies (ranging from .69 to .88). A probable contributor to this difference was that the task of choosing the target was probably easier in the direction of the suspect/target. The target faces in the target-based line-ups previous research because the foils were constructed to differ from the target by only a single feature. In the current experiment, actual face photographs were used in which there were many small differences between very similar faces in the line-ups, making the task more difficult, and producing greater variability in mock witness' choices.

No effect of construction order (first vs. second) was noted in this or in subsequent

experiments. This result suggests that the strategy of subjects who constructed the line-ups did not change after constructing the first line-up.

The finding of bias in target-based line-ups raises the question whether an alternative construction method might reduce or eliminate bias. This issue was pursued in three experiments.

## EXPERIMENTS 2-4

Experiments 2-4 were very similar and are described together. All re-examined suggestiveness in target-based line-ups. Also investigated were three alternative construction methods which attempted to reduce bias by enhancing the similarity among the line-up foils.

### Method

#### *Subjects*

In each experiment, 20 students participated in the construction phase, and later, 82 students participated in small groups in the presentation phase. Different subjects participated in each phase, and no subject participated in more than one experiment.

#### *Stimulus materials*

Each experiment started with a different pool of pictures taken from 1981-1986 yearbooks of two universities. Each pool contained 1000-1200 white males. In Experiment 2, 20 pictures were randomly selected as targets. From the remaining faces, 25-face foil pools were formed using the procedure described in Experiment 1. The stimulus preparation phase in Experiments 3 and 4 was similar to Experiment 2 except that they both started with 10 randomly selected targets instead of 20. The 10 targets plus each of their 25 foils were duplicated producing two identical sets of stimuli. The purpose of this procedural change was to control for faces used in the construction tasks between methods.

#### *Procedure*

In the construction phase, subject pairs were given two target-foil pool sets and were given instructions for one of the construction methods. Subjects either received the same target-based instructions given in Experiment 1 or they received instructions to construct line-ups using one of the alternative construction methods.

In Experiment 2, alternative-line-up subjects were told to find the foil most similar to the target, and after finding this face they were to complete the line-up by selecting four more faces based on similarity to *both* the target and the first foil.

In Experiment 3 the alternative line-up subjects were given the target and a foil that was randomly selected from the 25-face pool. They were told to complete the line-up by selecting two foils most similar to the target and two other foils most similar to the first foil.

In Experiment 4 the instructions given to alternative-line-up subjects were more elaborate. They were told about the problem with line-ups constructed solely around the target, that this procedure makes the suspect the most similar face in the line-up,

and that some persons can pick out the police suspect without having seen any of the faces before. Subjects were also told that, in fair line-ups, all line-up members would have an equal probability of being selected by persons who have not seen the suspect before. With this background, subjects were informed that their task was to construct line-ups in which all members are equally similar to each other. No explicit direction was mentioned on how they should select the foils except they were told that at any point they could exchange or replace any of their earlier choices. Subjects were encouraged to try out different collections of faces using any approach they deemed appropriate to meet the goal of equal similarity. The only constraint was that the target face had to remain in their final line-up.

After completing the first line-up the procedure was repeated for the second line-up. Completed line-ups were assigned to one of two presentation sets. Half of the line-ups in each set were target-based line-ups and half were alternative line-ups. In Experiments 3 and 4 an additional control was implemented. Sets were matched so that targets that appeared in target-based line-ups in one set, appeared in alternative-method line-ups in the other set. In the presentation phase, subjects received one of the two line-up sets. Otherwise, the presentation phase was identical to that of Experiment 1.

### Result and discussion

Targets in the target-based line-ups ( $M_s = .209, .254, \text{ and } .229$ ;  $SD_s = .121, .227, \text{ and } .178$ ) were chosen significantly more often than expected by chance,  $t_s(81) = 3.13, 3.47, \text{ and } 3.18$ ,  $p_s < .01$ , for Experiments 2–4, respectively. These results support Experiment 1's finding that line-ups based entirely on target similarity are biased. However, targets in the three alternative-method line-ups ( $M_s = .193, .200, \text{ and } .195$ ;  $SD_s = .133, .169, \text{ and } .172$ ) were not selected significantly more than chance,  $t_s(81) = 1.77, 1.78, \text{ and } 1.50$ ,  $p_s > .05$ , for Experiments 2–4, respectively. These results suggest that bias was reduced by the alternative construction methods. However, this implication is indirect and not definitive in itself.

Because all three experiments were similar, an overall analysis was used to directly compare line-up methods. A 2 (target-based vs. alternative line-up)  $\times$  3 (Experiments 2, 3, and 4) mixed-model analysis of variance showed that the alternative-method line-ups ( $M = .196$ ) were significantly less suggestive than the target-based line-ups ( $M = .231$ ),  $F(1, 243) = 5.26$ ,  $p < .05$ . There was no significant main effect of experiment or interaction (both  $F_s < 1.0$ ). This latter result is fortunate because combining data across more than one study can sometimes make interpretation difficult; the failure to show an experiment by line-up method interaction statistically eliminated this concern. The pattern of results indicate that all three alternative methods decreased bias compared to the target-based method, but none was better at decreasing bias than any other.

### GENERAL DISCUSSION

Wogalter and Jensen (1986), and Laughery *et al.* (1988), found results indicating line-ups based exclusively on target similarity are biased. However, these earlier

studies used artificial depictions of faces in which each foil differed from the target face by a single feature. The present research used actual face photographs and a more realistic procedure to construct line-ups. All four experiments supported the earlier work. Selection of foils based strictly on target similarity produces a bias in the direction of increased target selection. Apparently, these line-ups provide cues that enable mock witnesses to guess the target to a greater extent than would be expected from a truly fair line-up.

Bias was also investigated in three alternative-method line-ups. The characteristic common to these procedures was that foil selection was based in part on the facial characteristics of one or more foils. The purpose of this procedure was to determine whether increasing overall similarity among line-up members would lead to less bias than traditional target-based line-ups. Experiments 2, 3, and 4 showed that target selection in the alternative line-ups was not different from chance (unlike the target-based line-ups). However, this is an indirect way of showing that the alternative method reduces bias. An overall analysis comparing line-up methods confirmed the difference between the target-based and alternative-method line-ups. The lack of an interaction in this analysis indicates that the three alternative methods did not differ among themselves in their ability to reduce bias. Together, these results indicate that construction methods that distribute similarity among all line-up members are more fair than the traditional method of constructing line-ups based strictly on target resemblance.

The standard deviations showed that the mock witnesses varied in their target selection performance. Some had many hits, while others had few or no hits. The selection rates of particular targets and foils varied as well. The reasons for the variability are not known, and could be due to a number of factors, including effects at the construction and/or presentation phases. Further investigation would be necessary to determine the source(s) of this variability (e.g. the strategies the participants might have used).

Several additional comments should be made regarding the generalizability of this research to actual identification procedures. First, subjects in these studies did not view targets before making their line-up selections. As mentioned earlier, it was necessary to use persons who did not view the targets beforehand; otherwise, bias could not be separated from memory. Therefore, these experiments may not reflect the performance of actual witnesses viewing line-ups, except in cases where the 'witness' did not actually see the target at all, or saw it only briefly.

Second, mock witnesses were forced to make a choice for every line-up. Real witnesses are normally given the option of not choosing in fair line-up procedures. By forcing mock witnesses to make a choice the pattern of selections should reflect those of liberal, compliant or cooperative witnesses (Doob & Kirshenbaum, 1973). Applicability of the current research may be limited to persons who would lean towards making a choice or situations that encourage choosing.

Third, mock witnesses viewed 10 line-ups, rather than a single line-up as many witnesses might. Despite the fact that no feedback was given, some learning might have occurred as the mock witnesses proceeded through the line-ups. Because particular random orders of line-ups viewed by mock witnesses were not tracked, it cannot be determined whether the similarity bias effect occurred for the first line-up viewed by the mock witnesses in these experiments. However, a recently completed study by the first author suggests that this may not be a problem. In this experiment

the order of line-ups viewed by mock witnesses was tracked and showed no effect of line-up viewing order. Indeed, the trend of the results was opposite to the learning prediction: bias was somewhat higher for the first line-up than for the other positions.

Fourth, it is possible that some foils might have been inadequate or distinctive. If so, mock witnesses could immediately eliminate them from consideration, and thus, functionally decrease line-up size. However, foil quality was probably not a problem in these experiments for the following reasons: (1) The faces in the line-ups were very similar in appearance as they were first included into foil pools based on similarity, and then in the construction phase, additional similarity decisions were made by subjects. (2) Similar results were found by Laughery *et al.* (1988) and Wogalter and Jensen (1987) using foils that differed by only a single feature from the target. (3) Informal examination of the raw data showed that very few faces accrued no selections. For example, in the first experiment only 3 percent of the faces failed to receive at least some selections by subjects.

Recently, Wells and Luus (1990); (Luus & Wells, 1991) have suggested that line-ups should not be constructed around the appearance of the suspect, but rather they should be based on the preline-up verbal description given by eyewitnesses. This procedure may be a way to decrease the similarity bias described in this article but exclusive use of verbal description to construct line-ups has its own problems. The foremost problem is that people are not fluent in describing faces and the resulting descriptions are poor (Ellis, Shepherd, & Davies, 1980; Laughery, Duval, & Wogalter, 1986; Navon, 1990a; Shepherd, Davies, & Ellis, 1978). Part of the problem arises from the witness's difficulty in translating the memorable image of the suspect's face to language. In addition, the witness may not be thinking clearly shortly after a crime incident and may inadvertently omit or misdescribe crucial information in the verbal description. Another source of error comes from interpretation of the witness description by other persons (e.g. police officers in translating the description back to a visual image to search for a suspect, and later, to form a line-up). Additionally, line-ups may be conducted for reasons not based on a witness's verbal description, for example, in situations where a person may be caught with an offensive weapon near the crime scene (Navon, 1990b). Line-ups based exclusively on a preline-up verbal descriptions could allow the inclusion of foils that only remotely resemble the suspect but who still 'fit' the description. Moreover, support in court is questionable because the defence side could surely argue that the range of foils allowed by most descriptions permits the suspect to stand out unfairly. Constructing line-ups based entirely on verbal descriptions is probably not adequate alone, but as future research may show, it may be part of an approach that, along with suspect and foil similarity considerations, yields fair line-ups.

The present research calls attention to an interesting problem. As mentioned in the introduction, an often-stated guideline for constructing fair line-ups is that foils should be selected on the basis of similarity to the target. Research by Malpass and Devine (1983) and Brigham, Ready and Spier (1990) has shown that high-similarity line-ups are less suggestive than low-similarity line-ups. However, as we have seen, when the similarity rule is taken to its limit, the line-ups are suggestive. The similarity-fairness function probably has an inverted-U shape. Very low-similarity and very high-similarity line-ups are less fair than line-ups somewhere between the two extremes. We know that the maximal fairness with respect to bias would equal  $1/n$ . The question is how much and what kind of similarity is needed to attain this,

and what methods are most appropriate. Future investigations will help to define the methods and procedures that foster the construction of fair line-ups.

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