TOWARD A REPLICATION OF THE "FINGER-READING" EFFECT

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ABSTRACT: The “finger-reading” effect refers to successful identification by touch of apparently flat target numbers, colours, words, or symbols on paper in conditions where the participant is unable to see, or feel, or have any normal sensory cues to assist tactile identification. Studies of this have been running for over a decade in Taiwan. Nearly a quarter of children, after several finger-reading “training sessions,” have appeared to be able to determine the identity of targets by means of directly touching a 2-digit number or a complex character varying in 4 different colours printed by an ink printer on paper. Training procedures developed by Si-Chen Lee appeared to yield exceptional tactile recognition or extrasensory perception via the fingertips of children. However, these results may be unreliable due to a lack of rigorous controls to rule out possible fraud. It is thus not yet safe to assume that parapsychological abilities were in fact successfully measured. In this paper, pilot trials are considered that would develop empirically and assess controls on the finger-reading training processes. Modifications to training procedures are proposed. If the finger-reading effect can be replicated under robust and credible conditions, then perhaps more research resources could be attracted to investigating the possibility of exceptional and parapsychological finger-reading abilities in children.

The present paper builds on work described in previous papers on the finger-reading effect (Lee, 1998, 1999, 2002, 2003; Lee & Chang, 2001; Lee, Chen, & Tang, 2000; Lee, Tang, & Kuo, 2004; Tang, Lee, & Hsu, 2000). The detailed finger-reading literature review can be seen in the author’s paper (Shiah & Tam, 2005). This paper will focus on the finger-reading training paradigm developed by Si-Chen Lee. There, the average success rate in recognition (by a p < 0.05 criterion) by means of directly touching a two-digit number or a complex character varying in four different colours printed by an ink printer on paper was 24% (41 out of 175 participants) (Shiah & Tam, 2005).

Children for whom the techniques seemed to be successful reported that distinctive visual images had accompanied their successful trials. These visual images appeared as if seen in the real world. The children subjectively reported seeing answers on a “transparent” screen, sometimes an “opaque” screen (Lee, 1998, 1999; Lee, Chen, & Tang, 2000; Shiah & Tam, 2005; Tang, Lee, & Hsu, 2000). Children appeared to easily recognise complex characters or other complex symbols after seeing an opaque or distinct screen masking their normal vision. Having this visualising experience of an opaque screen in the mind correlated highly with correct recognition of targets. One approach would involve using more complex characters
that would in turn produce more complex visual imagery in the children's minds.

The possible existence of finger-reading ability gives rise to three important issues. First, the results of extrasensory perception (ESP) have been corroborated by means of rational explanations, but they have not been found to be compelling or convincing (Kennedy, 2001). ESP is a general term used for all paranormal abilities (Irwin, 2004). Many researchers have not been able to explain the results of ESP in a 'cognitive' or 'rational' terms (Irwin, 2004). Many researchers who have failed to explain the results of ESP have claimed that ESP is a product of sensory leakage (Morris, Summers, & Yim, 2005). The technique was tested and modified in more than 100 studies over the last three decades (Palmer, 2006; Palmer, 2003). Sensory leakage occurs, for example, when participants obtain information aurally rather than extrasensory (Irwin, 2004).

Following the example of the ganzfeld technique, the author proposes three stages to develop a well-controlled paradigm of finger-reading training. The first stage is to examine the original finger-reading training procedures in order to obtain sufficient information to design "temporary" training procedures. In the second stage, this temporary training paradigm will be empirically tested. Finally, a well-modified finger-reading training paradigm will be proposed for future research. An experienced parapsychologist, the late Professor Robert L. Morris, was involved in suggesting modifications to this training paradigm.

**Methodological Problems with Finger-Reading Training Procedures**

The major problems with ESP experimental designs are interpretations as coincidence, poor observation, deception, and sensory leakage (Hansen, 1990; Milton, 1996; Morris, 1999; Steinke, Milton, & Morris, 1998). In order to eliminate those problems, the original finger-reading procedures were initially examined in a recent study (Shah & Tam, 2005). The procedures and issues associated with inadequate controls are outlined briefly below. In addition, pilot trials will be conducted to develop procedures empirically and examine controls on the finger-reading procedures. Modified procedures are proposed.

**Material**

The stimuli consisted of 5 × 8 cm rectangular pieces of paper. In the middle of each piece of paper was a two-digit number from 11 to 99 in one of four different colors (black, green, blue, and red) printed by an ink printer. Confounding numbers, or "double chance numbers," such as 16 and 91, 19 and 61, 18 and 81, 66 and 99, 69 and 96, 68 and 89, 86 and 98, were excluded, so there were 75 numbers used in all. The trial samples were always prepared by a research assistant who did not participate in the finger-reading training process. They were folded twice and all put into a big envelope. Each sample was used only once in all procedures. In Training...
2, the digits were replaced by a Chinese character. Sometimes, for example, in some special conditions, the stimuli were drawn on a 5 x 10 cm or 3 x 10 cm rectangular piece of white paper (Lee, 1998; Lee, Chen, & Tang, 2000). Written or printed on the paper was a Chinese character or an English word or a symbol or a mathematical formula.

Barrier

The barrier (see Figure 1) is a black bag normally used for handling or changing photographic negatives (double-lined changing bag, 45 x 60 cm, Hakuba Photo Industry Co., Ltd.). Two cuffs are snugly fitted around the participant's forearms and the bag has two layers, each with its own zipper. Hardly any light could enter the bag, as was empirically shown by a light detector. The participant's hands could be moved freely within the bag. The purpose of the bag was to prevent the participants, experimenters, and coexperimenterers from seeing the targets.

1a. The bag has two layers, each with its own zipper.

1b. The participant's two hands are fitted into the bag.

Figure 1. The experimental bag

Warm-Up Training Before Finger-Reading Training

Participants were first required to watch a 30-min videotape describing this "touch reading" phenomenon, including how to identify the target. First, participants were required to sit, close their eyes, and breathe deeply with a calm and peaceful mind for at least 10 min. Then participants were required to practise image-making. The experimenter showed an object, such as a red apple, to the participants, who were asked to look at the apple very carefully and remember every detail of it. Then they closed their eyes to visualise the apple exactly as they perceived it. Next, they visualised the apple changing its colour three or four different times, e.g., to green, then to blue, and finally to black.

Training Procedure 1: Directly Touching a Two-Digit Number

The experimenter usually drew 10 samples randomly from the big envelope and put them on the coexperimenter's chair. Then the co-experimenter clenched one sample in his or her fist, put it into the bag, and closed the zippers. Participants must not see the target during this process. Next, participants put their hands into the two sleeves of the black bag and the sleeves were tied up. Participants were then required to open the folded samples and use their fingers to feel the targets. Participants were asked to focus on touch and to imagine that they could see the numbers while touching them. There were no time restrictions and participants were free to use whatever scanning pressure and speed they chose. They removed their hands to write down the answer after they had told the coexperimenter what they saw and the coexperimenter had recorded their response. The coexperimenter then took out the training item from the black bag and showed the target number to the participant. Thus, the participants received feedback and the coexperimenter recorded whether each participant's response was correct. Usually, children would attempt 20 items in one session, lasting 2 hr.

Training Procedure 2: Directly Touching a Complex Target (a Chinese Character)

Participants who had a statistically significant performance level were invited to attend this further session. Most of these reported experiencing a subjective visual experience when recognising the targets, and many of them described seeing a transparent or opaque screen in their mind. This training procedure was the same as the training procedure above for directly touching a target (involving two-digit numbers), but the stimulus was now a Chinese character. The purpose of the training was to help children to have the superior imagery function that tends to be associated with experiencing an opaque visual screen. It was found that an
opaque screen occasionally occurred in this training session. This might account for the better ability to correctly identify targets. Sometimes, in special conditions, one experimenter and several coexperimenter carefully watched the participant in Training Procedures 1 and 2.

Methodological Problems

There are three obvious methodological problems with these procedures as pointed out in the past (Shah & Tam, 2005). The first is randomisation. A target may not have been randomly selected from the target pools. The second problem regards sensory leakage. For example, the detailed information on how targets are obtained was not described. The production of stimuli was not standardized in all procedures. Third, fully detailed information of safeguards was not provided. Usually, one coexperimenter worked with two or sometimes three participants. The coexperimenter could not therefore reliably observe each participant’s responses and behaviour.

Pilot Trials

A pilot study ought to be conducted before a formal experiment, not only to maximize the possibility for participants to show their ESP ability but also to assess the efficacy of the controls that will be used in the formal experiment (Wiseman & Morris, 1995). In this regard, the author has carried out pilot trials of finger reading in Taiwan. One of the main purposes was to check the entire training procedure in order to develop effective barriers against possible fraud in later experiments. The other purpose was to examine whether Lee’s finger-reading effect had any potential for use in further work. Twenty-two participants aged from 7 to 31 were recruited. They were trained to directly write a digit number or a Chinese character on paper printed by an ink printer. In response to the inadequate controls described above, modifications to overcome these shortcomings in the author’s pilot trials were made.

Although the overall results of the author’s pilot trials indicate a significant result, it should be noted that the finger-reading procedure was vulnerable to cheating. For example, peeking behaviours might occur when the participant touched the target in the black bag. Participants might have seen the samples through an opening created by pulling at the two tight cuffs of the bag. Moreover, during the process of touching a target, the participants were allowed to remove their hands from the bag to write down their answer; then they could put their hands back in the bag. This would increase the possibility of peeking behaviours. For these two reasons, the author will not report the results of these pilot trials in this paper.

Toward a Replication of “Finger-Reading”:
Modifying the Training Procedures

Before the modified finger-reading training procedures are proposed, two problems need to be solved. This first is the peeking problem. To solve this problem, the author suggests adding eight new strategies. First, the author has designed an effective barrier, which is an 80 x 80 cm black screen with two cuffs snugly tied around the forearms. The barrier has two holes for the forearms to be inserted through before they then enter the black bag. The two holes of the screen are 8 cm in diameter and are 1.5 cm from the bottom. The distance between them is 15 cm. This screen can be set up on the table between the participant and the bag (see Figure 2). Second, the author suggests that at least one experimenter and one coexperimenter should closely monitor the participant, with one positioned on each side of the barrier. Third, experimenters and coexperimenter should make sure that the hands are properly inserted into the cuffs and that the barrier and bag are snugly tied/fitted around the forearms. Peeking can only take place if any gaps in the bag are exposed, and the bag-cuff are lined up exactly, as the participant could then conceivably peak through any small gap, although this would be impossible to achieve without the observers immediately noticing the participant contorting his or her body in order to see through the gap. Fourth, a part of the participant’s arms should be exposed (see Figure 2b). Thus, the key conditions at lining up gaps in the cuffs of the bag and barrier will be easily observed. These modifications should make peeking impossible, but in addition, fifthly, the author suggests using a video camera to record the whole process. Thus, the possibility of unnoticed peeking, perhaps as a result of the experimenters and the coexperimenter not observing closely enough, could be ruled out. The ideal view for recording the process must include the cuffs of the bag and the screen (see Figure 2b), as these are the only possible areas where gaps could be lined up. The recorded data should be viewed by a different researcher to check whether any peeking took place.

Sixth, the trial should be considered invalid when participants pull at the tight cuffs of the bag or the screen to make openings. Seventh, participants should not move their arms unnecessarily or pull at the bag or cuffs during touching, to minimize possible peeking in terms of causing any openings of the cuffs of the bag and the screen. Finally, the sample should be placed in a sealed opaque envelope to ensure that the experimenter/ coexperimenter and participants cannot see it until the envelope is opened. The envelope is not opened until it has been inserted into the double-zipped bag. The sealed envelopes can be put into an opaque plastic bag. The purpose of a sealed opaque plastic bag is to avoid the envelope’s being rendered transparent by the application of water, alcohol, or oil. The opaque plastic bag can be placed into a big envelope, which should be signed by the research assistant and be sealed with tape at both ends so that any tampering would be detected.
envelope or plastic bag should be tested under sunlight or strong light to prove that the targets cannot be seen. Under this condition, it is impossible to see any targets in the big envelope containing envelopes. Participants should not have a chance to see envelopes containing targets before or during the experiment. Under these arrangements, experimenters and coexperimenters too should not be able to see any targets.

The other question to be addressed is whether tactile cues might account for the finger-reading effect. The tactile task used in the finger-reading studies and the author's pilot trials involved ink-printed text, which is in a range of 1-20 microns (0.001-0.02 mm) in elevation. It is hypothesized that the paper absorbs most of the ink, implying a near zero elevation. To verify this hypothesis, the surface topology of the printing in terms of four different colors was investigated by means of the novel 3D surface profiler instrument Dekak 3, (Veeco Instruments, Inc.). The remarkable features of this instrument are its wide range of scanning area (~50 mm) and high vertical resolution (~0.01 mm). The horizontal and vertical axes of the printing were scanned to measure distance and vertical height, respectively. The printing in terms of a two-digit number on a three-letter English word was on a 5 x 8 cm rectangular piece of paper (A4 white 75 g/m²; H. E. Copier). Each digit or English letter size was 24 points in Times New Roman printed by a Hewlett Packard Officejet G85 colour printer. The result indicates that ink elevation and paper roughness cannot be distinguished, indicating a zero elevation.

The Modified Finger-Reading Training Procedures

In view of the peaking problem and inadequate controls described above, many safeguards will be used in the finger-reading processes in order to prevent possible fraud. The detailed materials and precise procedures for researchers to explore the finger-reading effect will be provided as an example.

Participants

According to Lee's findings, participants aged 7 to 13 are promising recruits. Participants who have a history of nerve or brain injury, finger trauma, or learning disability (including dyslexia), diabetes (because of associated peripheral neuropathy), and calluses on their finger pads should be excluded. These factors might affect tactile and learning results (Goldreich & Kanics, 2003; Vega-Bermudez & Johnson, 2004).

Preparations

Experimenteres have the right to declare a trial invalid if any of the following occurs:
1. A participant takes the stimulus out of the black bag
2. A trial is interrupted
3. The tight cuffs of the screen or bag are pulled at by a participant to cause an opening
4. A participant is unable to successfully open the envelope and extract the target under these "blind" conditions

Hypotheses and analyses should be specified in advance.

**Barriers**

The author suggests three kinds of barriers. As described before, the first is the screen, the second is the black bag, and the last is the video recorder.

**Experimental Room**

To guard against peeping, the room should be isolated and without windows, mirrors, or holes. One experimenter, one coexperimenter, and one participant should be in the room when the experiments are being conducted. The coexperimenter should give the participants the stimuli and record their responses with a video recorder as well as observing them. The experimenter should only record and observe participants' responses and behaviours. The author suggests that one experimenter and one coexperimenter stand on each side of the screen (see Figure 3). The participant's behaviour should be clearly monitored. Thus, the general guideline for the positions of an experimenter, a coexperimenter, and a video camera is that the frame of observation must include a clear view of the participant's hands, the cuffs, and the bag. The best view for a video camera can be seen above in Figure 2b. All participants' responses should be videoed in case the need for checking any details arises.

**The Procedure of Touching the Two-Digit Number Directly**

**Touching stimuli.** All experimental samples should be prepared in advance by a research assistant who will otherwise not be involved in the experiment. The coexperimenter who handles the target envelopes should have no relationship or contact with the assistant who prepared the targets.

The target stimuli should be produced in a strictly standard way: A two-digit number from 11 to 97 varying in four colours (e.g., red, green, blue, and black) should be printed in the middle of the paper. Numbers and their colours should be randomly generated by a computer generator designed by Paul Stevens, a research fellow of the Keesler Parapsychology Unit at Edinburgh University. The stimuli should be generated using a pseudorandom sort routine (based on the Microsoft Visual Basic RND function, seeded by the computer timer at the start of the program). The 75 numbers used should be the same as Lee's. A number with a colour should be randomly selected as a replacement; thus, the same targets could possibly be repeated. This is the most unpredictable randomisation, having no patterns that participants could possibly predict. Each trial will be independent from every other. For example, in each trial, each target with a particular colour always has a 1 in 300 chance—mean chance expectation (MCE)—to be randomly selected by the computer programme. Subsequent trials will be chosen from the original pool, meaning these also have a probability of 1 in 300.

Based on previous experience, a participant could usually try 20 samples in a section within 2 hr. Thus, the computer generator should be set to generate a certain number of sets of 20 targets at once. However, note that researchers can decide the number in each set as needed. All targets prepared for all participants will be generated in a single run by the computer generator. This means that the planned targets for all participants will be generated after running the computer generator in a single run.

The sample can be made up of 5 × 8 cm rectangular pieces of paper (A4 white 75 g/m²; H. E. Cooper). Each digit's size can be about 0.6 × 0.5 cm (Times New Roman, 24 points) printed by a Hewlett Packard Officejet G85 colour printer, which was confirmed to produce a zero elevation. It has
been suggested that there is a close parallel spatial relationship between tactile character recognition and visual recognition (in millimetres) (Loomis, 1990). The size of the character is not crucial for a successful tactile identification but the bandwidth, namely visual legibility, is important. The digit size used here was very easy for visual identification; accordingly, it was presumed to be relatively good for tactile identification.

Each sample should have a fold with a 1.5 cm length on the top left corner (see Figure 4) as a cue for participants to touch the target exactly. The person who prepares the samples should use a meter scale to make sure of the right length. Sheets should be folded before the numbers with colours are printed on them to avoid possible frauds. Specifically, note that the fold should be made before the target is randomly selected by the computer generator. If not, for example, the fold might be made slightly bigger if the number is higher, giving participants a cue to make a comparable judgment. Likewise, one corner of the paper could be cut to indicate which way is up. Participants were informed by other means to help the orientation in pilot trials before. They were told that the printing on the paper faces the front of the envelope, that the bag and target are not upside down, and that the front of the envelope faces the front (zipper side) of the bag. However, some of the participants were confused about the orientation of the target in the "blind" condition. This might lead to a psychological effect on participants' performance and is the reason why a fold is suggested to avoid such confusion.

![Figure 4. The target sample and its fold](image)

Each stimulus is put into a sealed opaque envelope of 15.2 x 8.9 cm size (Niceday envelopes, manila plain 70 gsm, gummed, product code 183422, Guilbert Company). The 20 envelopes in a pile are put into an opaque plastic bag. Each envelope is discreetly numbered to aid double-checking of results. The opaque plastic bag can be put into a 22.9 x 16.2 cm opaque envelope (Niceday envelopes, manila plain 90 gsm, gummed, product code 183422, Guilbert Company). This big envelope should be signed by the research assistant and be sealed with tape at both ends so that any tampering would be detected by the coexperimenter who cuts open the envelope during the experiment. The big envelope should not be opened until the experiment. These two types of envelopes and plastic bags were tested under sunlight to prove that targets cannot be seen. It was found to be impossible to see any targets in the big envelope within the plastic bag containing the 20 envelopes. Each set of envelopes should be numbered faintly 1-20 (for experimenters' recording procedure only) by pencil on the outside, which is not detectable by touching. Each small envelope can be sealed with its gum, yielding no different feeling between envelopes. Each piece of paper needs to be placed exactly in the middle of each small envelope. The short side of the paper needs to contact the bottom of the envelope. The printing on the paper needs to face the front of the envelope, ensuring that the printing is not upside down (see Figure 5).

![Figure 5. The target sample and its envelope](image)

The stimuli, small envelopes, plastic bags, and big envelopes should be used only once. Thus, participants cannot receive any target feedback marked on those materials by previous participants. The stimuli should be stored in a different room, to which neither participants nor the coexperimenter has access. Participants should not see any targets or their containers until receiving feedback. The research assistant who prepares the samples should save detailed information about the list of the stimuli in a secure computer and a copy on a disk in a sealed opaque envelope. Only the research assistant should have access to the computer and the sealed envelope containing the disk. This sealed envelope should be opened only after the experiment has been conducted. A double check of the stimuli after the experiment can be done to find possible recording errors or cheating by replacing samples.

**Finger-reading procedure.** Before the experiment, participants should be asked to show that their hands are empty and especially not concealing any trial samples used in the experiment. The coexperimenter should
make sure that the black bag is empty between trials. The purpose of these checks is to prevent conjuring tricks being used to conceal trial samples. Additionally, the participants should not be allowed to carry any mobile phones or radio equipment to guard against communication with any possible accomplice.

Warm-up training before the finger-reading training. The training period should not exceed 2 hr a day due to children’s limited attention. There can be a 15-min break each day, during which participants can be rewarded with drinks or snacks.

The process begins with warm-up practice. First of all, the experimenter turns the light off. Participants should be required to sit, close their eyes, and breathe deeply with a calm and peaceful mind for at least 5 min, after which the light should be put back on. Then participants should be required to imagine “image making.” The experimenter should show a simple object such as a red apple to the participants, who should be asked to keep their eyes closed and remember every detail of it. Then they should look at the apple very carefully and visualize the apple exactly as they perceive it. Participants should also see a demonstration describing the “touch reading” phenomenon, including how to identify the target.

Procedure for Touching a Two-Digit Number

Participants can be given three to five practice trials. The experimenter should give the coexperimenter one big envelope containing a plastic bag inside which are 20 small envelopes. The experimenter should open the sealed big envelope, take one small envelope from the plastic bag, and then close the zippers. The rest of the envelopes should be kept in the plastic bag until required. Thus, the small envelopes should be kept in the plastic bag until required. All the envelopes should be kept in the plastic bag until required. The experimenter should not see any envelopes during this process. Participants should be informed that all envelopes are used and that no participant should see any envelopes during the experiment. Participants should be clearly informed of the meaning of randomisation.

Next, participants should put their hands into the two tight cuffs of the screen and the black bag. They should be required to open the sealed envelope to take out a target sample to scan using their fingers. According to the participants’ experience in pilot trials, it was found that the procedure to open the envelope to remove the target paper without tearing the paper or adding additional folds is found to be easy and quick to open the envelope to remove the target paper without tearing the paper or adding additional folds. Participants should be taught to tear the very end of right or left side of the envelope to remove the target paper because the target paper will be in the middle of the envelope.

During the finger-reading training procedure, the participants should be required to focus on the touch and to imagine that they can see the numbers while touching the target. They should be told that there is a fold in the top left corner as a cue for them to touch the target exactly. Participants should be told not to add any additional folds or any marks on the target paper to keep targets intact so they can be checked later if necessary by another independent researcher to see if any obvious patterns were made by the person who prepared the targets.

There are no time restrictions, and participants are free to use whatever scanning pressure and speed they choose. They should be asked to inform the coexperimenter about whatever they see and feel. They cannot take their hands out of the black bag during the touching procedure. Participants should be told that pulling at the bags or cuffs is not allowed, and to avoid any unnecessary movement of their arms. They can take their hands out of the black bag only after they tell the coexperimenter their final response. In the meantime, the coexperimenter and the experimenter should record the participants’ responses and response times.

After the participant finishes the trial, the coexperimenter takes out the item from the black bag and shows the number with its colour to the participant. Participants therefore get feedback and the coexperimenter is able to record whether the participant’s response was correct. The reason for giving feedback is so that participants are able to learn whether their judgments are accurate. It is hoped that this will help to induce and improve any finger-reading ability in terms of permitting a target-related image to come to mind. According to previous experience, children could try around 20 items within 2 hr. Each participant should try at least 80 samples in this experiment over 4 different days, or more if time allows.

If participants want to have a break during the experiment, the coexperimenter should seal the big envelope containing the plastic bag holding the rest of the samples and put it into another isolated room. The experimenter should lock the room so that no one can access the room and the samples.

It should be noted that the sequence of targets presented to participants should not be changed. If a set of 20 targets cannot be completed by a participant, the next participant can use the rest of them. Statistically, this action cannot affect hit rates since the targets are selected randomly. The big envelope containing the plastic bag holding the unfinished samples should be signed by the coexperimenter and sealed with tape at its opened end. The experimenter should store the big envelope in another locked room.

If participants succeed in three consecutive correct recognitions of numbers with their colours, in addition to giving their verbal reports, they should be asked to describe and draw how they visualised their correct answers. This might provide possible answers as to how children decide...
their responses in their minds and about the details of mental imagery. Three hits reach a significance ($p < .05$, binomial, one-tailed, MCE = 1/800) when total trials are 245 for each participant. As a result, 3 hits could be a good score when total trials of a participant do not exceed 245.

It has been suggested that the light might reduce the chances of recognising colours (Tang, Lee, & Hsu, 2000). Consequently, the author suggests using light while conducting the finger-reading studies, but the issue of whether light is necessary for recognising colours should be further explored in later studies.

Procedure for Touching an English Word Directly

Earlier it was noted that seeing a “screen” played an important and common role in successfully recognising targets while touching stimuli; the screen was reported by the children to last for several seconds. There are two reported forms of screen: transparent and opaque. The transparent screen was frequently activated when the children directly touched a two-digit number, and the opaque screen was more often activated as children directly touched a complex target. The author suggests that in future studies a complex target should be used, such as an English word.

Participants who report having seen a transparent screen with a positive result in the first experiment should be invited to take part in this experiment. The safeguard considerations, touching stimuli, barriers, and procedures should be the same as described for touching a two-digit number directly. However, the warm-up procedure can be omitted in this study.

The target stimuli should be replaced by a three-letter meaningful English word in capitals. The data pool can include 1,002 different three-letter English words derived from MRC Psycholinguistic Database (http://www.psy.uwa.edu.au/mrdatabase/uwa_mrc.htm). A computer programme, again designed by Paul Stevens, can randomly choose the target words for producing samples using a pseudorandom sort routine.

Similarly, if participants succeed in three consecutive correct recognitions of numbers with their colours, they should be asked to describe how to get answers afterward. Three hits reach significance ($p < .05$, binomial, one-tailed, MCE = 1/4008) when total trials are 3,270 for each participant. As a result, three hits could be a good success rate when the total trials of a participant do not exceed 3,270.

The safeguards against possible frauds in the finger-reading studies are summarized in the Appendix. This summary also can serve as a checklist while conducting finger-reading studies.

Conclusion

This paper presents a modified finger-reading training paradigm under stringent conditions. The author proposes this standard paradigm in the hope of attracting more researchers and resources to use its safeguards and investigate the finger-reading effect. However, these finger-reading training procedures might still have limitations even under perfect safeguards. Three sources affecting ESP performance cannot be entirely eliminated. The first is the psi ability of the participants or the experimenters. Psi is a general term including both ESP and psychokinesis (PK), an ability to achieve movement by mind alone (Irwin, 2004). Participants and/or experimenters might influence each other by using their psi abilities. Given the unknown nature of psi, concerns regarding the aspect of psi influence do not appear to be of immediate importance. The second source that could affect participants’ ESP performance is the experimenter’s attitude of believing in psi or not (Smith, 2003; Watt & Ramakers, 2003). However, the details of how this could happen are still unknown. One possible strategy that allows this possibility to be monitored is that the experimenter’s and coexperimenter’s beliefs in psi should be measured. These data might later be used to develop possible explanations of the finger-reading effect. The final possibility remains of experimenters or coexperimenter cheating, whether deliberately or unconsciously. Experimenters or coexperimenter could cheat in a variety of ways, such as making detectable marks on the targets, allowing or helping participants to cheat, or even changing the records. Possibly the best way to rule out potential fraud is via replication studies by different researchers (Alcock, 2003). This is another major reason for additional finger-reading studies to be undertaken, with a more universally agreed-upon methodological approach.

The finger-reading procedures were developed from Chinese culture. One might ask whether it can be found in Western culture. Needless to say, no studies about this issue have yet been undertaken. To answer this question, the author would like to make the initial assumption that if there is such a thing as ESP, it would be a universal possibility and not culture-specific. The author is now attempting to replicate the finger-reading effect in Edinburgh. It is considered a positive effort toward cooperation for the mutual benefit of both Western and Eastern research.

Finally, although this finger-reading training paradigm has been proposed, it may have to be modified in the future due to undiscovered possibilities of fraud or newly developed machines for detecting cheating. Although such changes might be inevitable, the proposed model will still be advantageous for finger-reading studies in the long run.

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APPENDIX

Possible frauds

Suggested safeguards
1. Black bag
2. Barrier
3. A video camera should record the whole process and the recorded data should be examined by a different researcher to check for any peeking.
4. Experimenter and coexperimenter should make sure the cuffs of the barrier and bag are snugly tied/fit around the forearms.
5. At least one experimenter and one coexperimenter should closely monitor the participant, with one positioned on each side of the barrier.
6. Sections of a participant’s arm should be exposed between the cuffs (see Figure 2b.).
7. Participants should be told that moving the arms and pulling at the bags or cuffs are not allowed during the touching process.
8. The trial is invalid when a participant takes the stimulus out of the black bag or pulls at the tight cuffs of the barrier or bag, possibly causing openings.
9. Participants should not see any targets or their containers (small envelopes) until receiving feedback.
10. The samples should be placed in a sealed opaque envelope to ensure that the experimenter/coexperimenter and participants cannot see them and the envelope should not be opened until it has been inserted into the double-zipped bag.
11. If participants want to have a break during the experiment, the coexperimenter should seal the plastic opaque bag containing samples and put it in another locked room.
12. The experimental room should be isolated and should contain no windows, mirrors, or holes.

Peeking

Experimenters – knowledge of targets
1. Experimenter and coexperimenter should not know the contents of the target envelopes until after each trial.
2. Targets should be prepared by another researcher who will not take part in the experiment.

Randomisation
1. A target should be randomly selected as a replacement from target pools and the procedure should be specified.

Recording
1. Both experimenters and coexperimenter should keep written records of participants’ responses.
2. All participants’ responses should be recorded by a video recorder in case the need for checking any details arises.

Replacement
1. Before the experiment, participants should be asked to show that their hands are empty, and especially not carrying any samples used in the experiment.
2. The coexperimenter should always check to be sure that the black bag is empty between trials.
3. After the experiment, the recorded data should be checked against the original data kept by the research assistant who prepared the samples.

Possible tactile cues or other cues
1. The production of samples should be in a standard way to minimise any tactile cues from the targets.
2. The stimuli, small envelopes, plastic bags, and big envelopes should be used only once.
3. If necessary, the samples can be checked later by another independent researcher to see if any obvious patterns were made by the person who prepared the targets.
4. Samples should not be used if a trial has been interrupted.
5. The person who prepares the targets should not have any relationship or contact with the participants or coexperimenter and should not take part in the experiment or be further involved with it in any way beyond the initial preparation of targets.
6. Only the research assistant who prepares the samples should be able to access the detailed information about the list of the stimuli. The information of the stimuli should be revealed only after the experiment has been conducted.
7. Participants should not be allowed to carry any mobile phones or radio equipment to guard against communication with any possible accomplice.