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RESEARCH ARTICLE

Psi Effect or Sensory Leakage: Scrutinizing the Ball Selection Test

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Abstract—The Ball Selection Test (BST) (Ertel 2004) is a simple, entertaining, forced-choice test for assessing psi ability. Fifty ping-pong balls, each with a number from 1 to 5 written on its surface, are used as targets. After the balls are shaken in an opaque bag, a participant blindly draws out one ball while attempting to call out the number written on it. If the number on the ball matches the participant's call, the trial is scored as a "hit." Because the numbers are equally distributed across the 50 balls, the mean chance expectation (MCE) for a hit is 20%. Two earlier experiments had suggested that sensory cues such as tactile cues from the written numbers or temperature cues from recently selected balls could not account for successful BST performance. The experiment reported in this article further examines this artifactual concern by comparing hit rates on the standard BST procedure with those on a modified version of the BST that required participants to wear blindfolds and gloves. Hit rates were significantly above chance on both procedures and virtually identical to each other, strongly confirming that sensory leakage cannot account for above-chance performance on the BST. The BST has several other features that make it uniquely suited for screening psi abilities.

Keywords: Ball Selection Test—paranormal—psi—sensory leakage—ESP

Introduction

Over the years, laboratory methods for testing psi have become increasingly well-controlled in order to rule out non-psi artifacts and explanations for positive findings. These increased controls may have been purchased at a price, however: Several psi researchers have suggested that artificial technical precautions introduced into psi testing can promote tense mental sets on the part of participants that can inhibit psi performance (e.g., Braud & Braud 1974, Braud 1975, Honorton 1977, Schmeidler 1977). To remedy this problem, the Ball Selection Test (BST) was developed to establish

simple, concrete, and entertaining psi-testing conditions that would encourage participants to behave with the freedom and confidence they display in everyday life settings (Ertel 2004, 2005a, 2005b, 2009, 2010).

In the standard BST procedure, an opaque gymnastics bag is filled with 50 ping-pong balls, each one with a number from 1 to 5 written on it with a felt-tip pen. Each number appears on ten balls. The participant is instructed to place a hand into the bag, to announce a number aloud, and then to withdraw one ball. If the number on the ball matches the participant's call, the trial is scored as a "hit." The mean chance expectation (MCE) for a hit is 20%. The participant is free to approach the task in several ways. He or she can first grasp a ball and then guess the number on it or announce a number first and then attempt to select a matching ball. The participant is also free to feel among the balls or to grasp the first one that comes to hand. After each trial, the selected ball is put back into the bag and the bag is shaken. Care is also taken to ensure that the participant cannot see into the bag before or during the test trials.

Potential participants in a BST study are generally prescreened by having them first conduct a BST session in their home without supervision. They fill out recording sheets for six runs of 60 trials each for a total of 360 trials and then deliver the sheets to the experimenter. Participants whose hit scores are significantly above chance are then invited to the laboratory for formal BST testing. This prescreening has successfully identified samples of participants who reliably and repeatedly show above-chance performance on the task.

Because participants actually touch the numbered balls in the BST, it is important to rule out the possibility that successful performance might be due to the detection of sensory (tactile) cues. Although a comprehensive overview of research on the psychophysics of tactile perception contains no studies of tactile pattern discrimination (Cheung, van Erp, & Cholewiak 2008), Lee, Tang, Chen, and Fang (2002) claimed that Chinese children were able to distinguish two-digit numbers or a complex Chinese character in four different colors printed on paper. This finding, however, failed to replicate under sounder methodological conditions (Shiah 2008).

In previous research with the BST, Ertel (2005a) tested the possibility that tactile cues might account for successful BST performance by examining the sequence of hits across trials. Because participants receive trial-by-trial feedback, they can be expected to improve their performance across trials if they are using tactile cues. Ertel tested this on the BST standardization sample of 234 participants. There was no evidence of any improvement across trial runs of 60 trials: The correlation between hits and trial number was nonsignificant, $r(58) = .09$. Moreover, this was true both for participants

who scored below the median as well as for those who scored above the median—whose BST performance would be the most likely to reveal cross-trial improvement if they were learning tactile cues as they proceeded.

Ertel (2005a) tested a second artifactual possibility on the standardization sample. Because each selected ball is placed back into the bag after the trial, the returned ball might be temporarily warmer than the remaining balls in the bag after being handled by the participant. To test this, Ertel calculated the difference between hit scores for more recently selected numbers and hit scores for earlier selected numbers for each of the 238 participants. If hit rates are boosted by the perception of temperature differences, then these difference scores should correlate significantly with their overall hit scores. They did not, $r(236) = .05$, *nonsignificant*.

Finally, Ertel (2005a) tested for memory effects. If the scrambling of the balls after each trial is insufficiently thorough, then a participant might be able to remember the relative placement of previous selections (consciously or unconsciously) to correctly identify previously called numbered balls. This effect would be enhanced if a participant tended to call the same number repeatedly across successive trials.

To test this, four female participants who had demonstrated repeated success on the BST were recruited to complete 960 trials each. These women all were members of a Ukrainian family who had participated in BST experiments over several years. On half the trials they were challenged to select a sequence of balls all with the same number. For example, within a run of 60 trials, they were first challenged to select a ball with a "1" on 12 successive trials, then a "2" for the next 12 trials, and so forth. For the other half of the trials, they were challenged to select balls in the sequence "1234512345..." in each run of 60 trials. If memory of ball placements in the bag is playing a role in successful BST performance, then participants should have a higher hit rate on the repeated trials ("11111..22222..33333..") than on the non-repeated trials ("12345123...").

The results showed, first, that this selected set of participants continued to replicate their earlier superior BST performances. In a total of 3,840 trials, they correctly selected the numbered ball on 30.1% of the trials, where 20% is the MCE ($z = 15.6$, $p = .000001$). The critical finding was that the difference between the two test conditions differed by only 1 hit (1157 vs. 1156). In short, memory artifacts appeared to play no role in their successful performance on the BST.

The experiment reported below returns to the issue of sensory feedback, testing whether a sample of gifted participants can continue to obtain significant BST scores while wearing both blindfolds to preclude visual leakage and gloves to preclude tactile and temperature cues.

Method

Participants

Seven women with a previous record of high performance on the BST participated in this experiment. Three of them were members of the Ukrainian family who had participated in the memory experiment described above. The other four participants were students at the Psychology Institute of Göttingen University who had previously displayed superior BST performances in both home and laboratory settings.

Procedure

As noted, all seven of the participants had previously been tested on the standard BST procedure. For the present experiment, the participants wore both blindfolds to block any visual cues and silk gloves to block both tactile and temperature cues. The sessions with the three Ukrainian women were conducted by their fourth family member serving as the experimenter; sessions with the four student participants were conducted by the author. Because the standard and glove trials were conducted at different times with the Ukrainian sample, the two conditions comprised different numbers of trials.

Results and Discussion

The results show that the participants achieved nearly identical, significant hit rates under both the standard BST procedure and the procedure in which they were required to wear blindfolds and gloves: Under the standard procedure, they obtained 2,293 hits out of 7,740 trials for a hit rate of 29.6%, which is significantly above the MCE of 20%, $z = 21.16$, $p < .000001$. Under the blindfold/glove modification, they achieved 994 hits out of 3,420 trials, a hit rate of 29.1%, $z = 13.23$, $p < .000001$. In fact, all but one of the participants achieved a hit rate of at least 27.5% ($p < .00003$) under this procedure. The difference between the two hit rates is not significant, $z = 0.599$, two-tailed $p = 0.55$.

It was noted in the Introduction that artificial technical precautions introduced into psi testing can produce mental sets that might well inhibit psi performance. It is thus pertinent to note that the only participant who failed to show a significant BST effect in the modified procedure remarked in a post-experimental interview that the gloves made her feel uneasy.

It is concluded that the results of this experiment, in conjunction with results from the earlier validating experiments discussed in the Introduction, provide persuasive evidence that enhanced performance in the

BST protocol cannot be accounted for by sensory-leakage artifacts. Instead, its ecological characteristics appear to be validly psi-conducive, rendering it uniquely suitable for screening psi abilities. The BST is an objective procedure that appears to be more reliable and valid than the pencil and paper questionnaires frequently used to identify suitable participants for psi investigations. The fact that the BST requires considerably less effort and cost than other psi-screening procedures is an additional benefit.

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