

Experimental

INTERPERSONAL HAND-ENERGY REGISTRATION: EVIDENCE FOR IMPLICIT PERFORMANCE AND PERCEPTION

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ABSTRACT

Treatments such as Non-Contact Therapeutic Touch are based on the hypothesis that the hands can send and receive energy and information. From a dynamical energy systems perspective, the hands can be viewed as rich generators of complex patterns of biophysical energy and information, including electrostatic movement effects, electromagnetic potentials (muscular, cardiac, skin potentials, etc.), and temperature (*e.g.* infrared). Two experiments ($n = 20$ and $n = 41$) were conducted to determine whether blindfolded subjects could detect the presence of an experimenter's hand placed a few inches above one of their hands. A 2 x 2 within subject counter-balanced design (left and right subject's hands by left and right experimenter's hands) was employed. The average correct detections was 66% (chance = 50%, $p < .00001$). Subject's average estimate of their performance was 54%. Poor and low performance subjects correctly estimated their actual performance, whereas medium and high performance subjects seriously underestimated their performance. However, even for subjects who performed at or below chance, their ratings of confidence per trial were significantly higher for correct versus incorrect trials, suggesting that they had implicit perception of hand-energy. Subjects who spontaneously reported some awareness of temperature (but not tingling or pressure) reported higher overall estimates of performance. Implications for future research on interpersonal hand-energy registration are considered.

KEYWORDS: Energy, dynamical energy systems, interpersonal registration, Non-Contact Therapeutic Touch

INTRODUCTION

Emerging research on Non-Contact Therapeutic Touch (NCTT) suggests that the hands can be used to alter biological functioning and impact the healing process. For example, Wirth reported the results of a double-blind study of the effects of NCTT on the rate of surgical wound healing.¹ Full-thickness dermal wounds were incised on the lateral deltoid region using a skin punch biopsy instrument, on healthy subjects randomly assigned to treatment or control groups. Subjects were blinded both to group assignment and to the true nature of the active treatment in order to control for placebo and expectancy effects. Active and control treatments were conducted in daily sessions containing five minutes of exposure to a hidden NCTT practitioner or to sham exposure. The results indicated that subjects treated with NCTT showed a significant acceleration in the rate of wound healing as compared to non-treated subjects over 16 days.

Rauscher,² in her review of three major NCTT studies in which a well-known healer's intention to produce a healing effect was correlated with increased growth and motility in a well-characterized bacterial system, noted that the laying-on-of-hands for healing has an ancient tradition as depicted, for example, in the art of ancient Egypt and Babylon. It has long been believed that the hands are not only a rich source of energy and information, but they can also serve as a sensitive vehicle for detecting energy and information as well.

All systems, both non-living and living, generate energy and respond to energy.³ Russek and Schwartz have illustrated how the integration of modern concepts from systems theory and energy leads to a set of dynamical energy systems hypotheses that can foster theory and research on intrapersonal and interpersonal energetic interactions.⁴

For example, Russek and Schwartz have reported that it is possible to measure the registration of cardiac energy between people.⁵ A dynamical energy systems approach to cardiac energy predicts that registration of cardiac energy can occur between individuals, and that the degree of registration may be greater in persons who are more open to interpersonal information.

As part of a 42 year follow-up to the Harvard Mastery of Stress Study, 19 channels of EEG and the ECG were recorded during a 2 minute eyes-closed resting baseline from 20 Harvard graduates currently in their 60's and from an

experimenter who sat three feet in front of the subjects.⁵ Cardiac-synchronized energy patterns were calculated in the subject's EEGs separately triggered by the subject's ECG and the experimenter's ECG. When the subject's own ECG was used as the trigger, significant evidence of the subject's ECG in the subject's EEG was found, primarily in the posterior regions. When the experimenter's ECG was used as the trigger, significant evidence of the experimenter's ECG in the subject's EEG was found, primarily in anterior regions, in subjects who rated themselves in college as having been raised by loving parents. These subjects were also significantly healthier in late adulthood than subjects who rated their parents low in loving.

A dynamical energy systems approach to intrapersonal and interpersonal energetic interactions can be applied to any organ system or region of the body, including the hands. Table I displays five dynamical energy systems hypotheses originally explicated for the heart, and then, applied to the hands.^{4,5}

In terms of energy (and associated information), the hands can be viewed as generating an exquisitely complex set of integrated energies. Different organs and tissues within the hands each generate different energies and information, and this *pattern of energy and information is emitted systemically*. For example, the skin generates skin potentials (DC voltage differences) plus sweat (which influences temperature as well as increases electrical conductivity). The skin contains blood flow (as do the muscles in the hands); and the blood flow conducts cardiac energy patterns (for example, the ECG plus cardiac sounds) and also generates heat (which creates infrared pulses with each beat of the heart). The muscles in the hands generate electromyographic (EMG) signals. The hand also participates in generating electrostatic field effects. These well documented sources of energy are emitted synchronously and reflect a part of the total dynamical energy generated by the hand-energy system.

The hands can also be viewed as containing an exquisitely complex and sensitive set of integrated transducers for detecting energy. The hands are best known for detecting temperature, pressure and stretch. It is possible that these receptors may also transduce related energies. For example, electrostatic field effects may exert subtle pressures or stretches that can be registered. Micro breezes might be registered by temperature receptors in addition to pressure and stretch receptors. Whether electrical or magnetic field effects can be transduced has yet to be examined.

Table I
Five Dynamical Energy Systems Hypotheses
and Their Applications to the Hands

Dynamical Energy Systems Hypothesis	Hand-Energy Hypothesis
1. Systems are expressions of organized energy and emit energy.	1. The hands are a dynamic energy-generating system.
2. Energy activates and regulates systems interactively.	2. Energy from the hands may regulate organs and cells in the body interactively.
3. Energies (types and frequencies) are emitted simultaneously, including at the quantum level.	3. The hands generate patterns of energy. The hand-energy pattern includes electrical, magnetic, sound, pressure, temperature (infrared) and electrostatic energies.
4. Energy is transmitted between systems dynamically and interactively.	4. Hand-energy patterns may have interactive effects interpersonally and environmentally as well as intrapersonally.
5. Levels of consciousness may modulate patterns of energy in health and illness, and conversely, patterns of energy may modulate levels of consciousness.	5. Levels of consciousness may modulate hand-energy patterns in health and illness, and conversely, hand-energy patterns may modulate levels of consciousness.

The purpose of the present research was to determine whether the energy generated by the hands (of experimenters) can be registered by the hands (of subjects). Research on NCTT, when viewed from the perspective of dynamical energy systems theory, suggests that interpersonal hand-energy registration should be demonstrable, even in unselected subjects and experimenters. However, since the registration of hand-energy might be subtle, especially in randomly selected subjects and experimenters, we adopted sensitive experi-

mental procedures previously used for measuring performance, perception, and EEG responses to subthreshold stimuli (*e.g.* odors, see Schwartz)^{6,7} and applied them to the measurement of interpersonal hand-energy registration.

METHOD

SUBJECTS

A total of 61 volunteer subjects, 20 in Experiment 1, and 41 in Experiment 2, were tested. Subjects ranged between the ages of 14 and 55 (average age = 25.2 years). There were 24 males (average age = 27.5 years) and 37 females (average age = 23.6 years). In Experiment 1, most of the subjects were not known previously by the experimenter. In Experiment 2, all of the subjects were known by their respective experimenters.

EXPERIMENTERS

In Experiment 1, one male experimenter (J. B., age 21) ran all 20 subjects. To determine whether the effects observed in Experiment 1 could be replicated using different experimenters, in Experiment 2, 20 different experimenters ran 2 subjects each, and 1 experimenter ran 1 subject, for a total of 41 subjects. The age of the experimenters ranged between 20 and 46 (average age = 25.9 years). There were 10 male and 11 female experimenters.

EXPERIMENTAL DESIGN

A 2 x 2 within subject design was employed. On a given trial, either the subject's left hand or right hand was selected to receive, and the experimenter used either her or his left hand or right hand to send. A block of trials contained one of each of the 4 types of trials (subject's hand left or right by experimenter's hand left or right). A total of 6 blocks of trials (24 trials total) were administered to each subject. The order of the four trials varied from block to block. In Experiment 1, each subject received a different order of the

6 blocks of trials. In Experiment 2, the subjects received the same counter-balanced order of the 6 blocks of trials.

DEPENDENT MEASURES

There were two dependent measures per trial. After each trial, subjects indicated which of their hands (left or right) was receiving the hand-energy of the experimenter, and then they rated the confidence of their guess, from 0 to 10. Chance performance was defined as 50% correct (12 correct guesses—hits, and 12 incorrect guesses—misses).

After the 24 trials were completed, subjects filled out a brief questionnaire in which they estimated what percent they were correct (total estimated performance), and then they reported what sensations they thought were associated with correct guesses.

PROCEDURE

Subjects were seated in a comfortable chair facing the experimenter. Subjects placed their hands either on the arms of the chair or on a pillow on their laps, with their palms facing up. Subjects wore a blindfold for the duration of the experiment.

The experimenters sat facing the subjects, with the palms of their hands placed together in their laps. The experimenters were instructed to keep their palms together in order to maintain their hand temperatures and to minimize left-right hand temperature differences. For a given trial, the experimenter took her or his right or left hand and placed it, palm facing down, 3 to 4 inches above the subject's left or right hand. The experimenter then said "ready" and the subject was asked to guess, whenever ready, which hand was covered. After the subject made a choice, the experimenter's hand was removed. The subject then rated the confidence of her or his guess using the numbers 0 to 10, whereupon the experimenter recorded the choice and the confidence rating. The experimenter's palms were then placed back in their laps. Intertrial intervals were approximately 30 seconds.

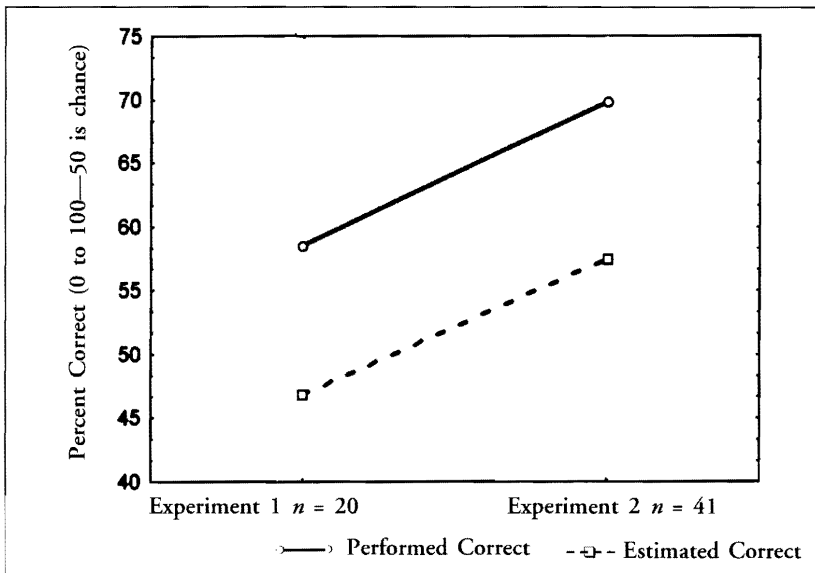


Figure 1. Performance and estimation in Experiment 1 and Experiment 2.

RESULTS

The percent correct performance data (out of 24 trials) and the total percent correct estimated (perceived) data (reported by subjects in the post experimental questionnaire) are displayed in Figure 1 separately for Experiments 1 and 2.

It can be seen that in both Experiments, subjects average performance (66.1%, $n = 61$) was slightly to moderately above chance (58.5%, $n = 20$ in Experiment 1, 69.8%, $n = 41$ in Experiment 2). Subject's estimated performance (54.0%, $n = 61$) was approximately 12% lower than their actual performance (66.1%) in both Experiments (46.8% in Experiment 1 and 57.4% in Experiment 2). Analyses of variance (ANOVAs) with Experiment (1 and 2) as a between groups factor and Measure (actual performance and estimated performance) as a repeated measure factor revealed significant main effects for Experiment ($F [1,59] = 9.81, p < .003$) and Measure ($F [1,59] = 16.86, p < .0001$) but no interaction ($p < .91$). Experiment 2 resulted in significantly higher performance and comparable increases in estimated performance than Experiment 1 (possibly due to increased interpersonal comfort between the

experimenters and subjects in Experiment 2). However, both groups of subjects subjectively underestimated their actual performance (see below).

Compared to 50% chance performance, subjects performance was significantly greater than chance in Experiment 1 ($p < .02$) and Experiment 2 ($p < .00001$). Hence, evidence of significant interpersonal hand-energy registration as measured by actual performance was observed in both Experiments. Forty-seven of 61 subjects achieved performance scores above 50%. However, the subject's subjective estimates of their performance were not significantly above chance. Thirty-two of 61 subjects estimated their performance to be above 50%.

Figure 2 displays the average ratings of confidence for the correct (hit) and incorrect (miss) trials for Experiments 1 ($n = 20$) and 2 ($n = 40$, one subject had missing rating data). It can be seen that subjects' average confidence ratings were slightly but significantly higher for correct trials than incorrect trials ($F [1,58] = 9.04, p < .004$), indicating that they had some awareness of

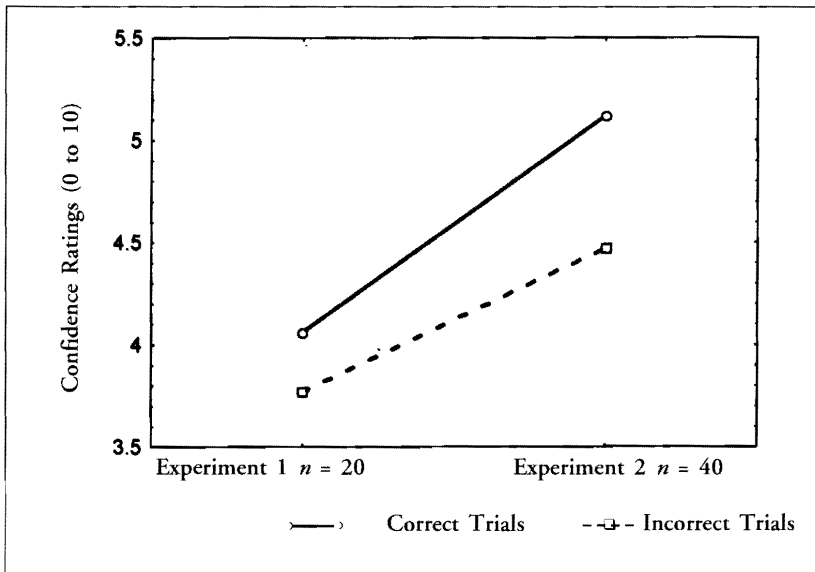


Figure 2. Confidence on correct and incorrect trials in Experiment 1 and Experiment 2.

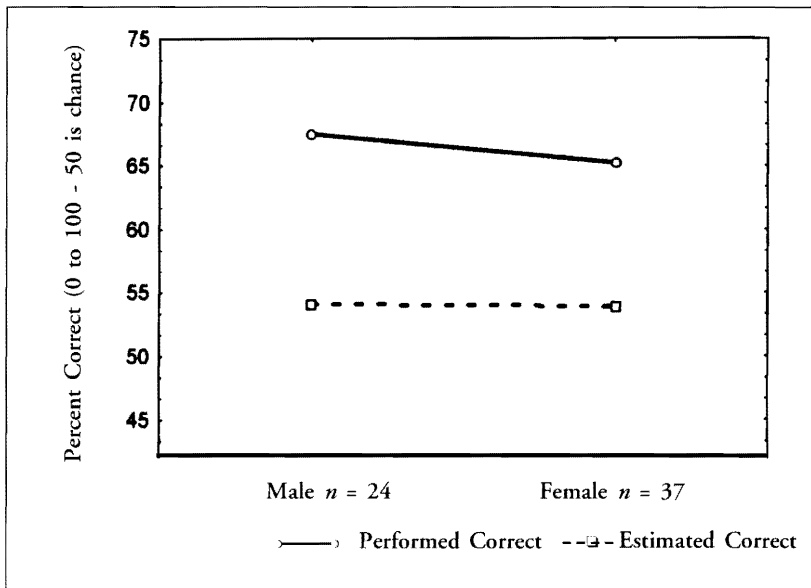


Figure 3. Performance and estimation in males and females.

when they were able to correctly identify which hand was receiving the experimenter's hand-energy. There was a trend for Experiment 2 to have higher confidence ratings in general than Experiment 1 ($F [1,58] = 2.78, p < .10$).

Figure 3 combines Experiments 1 and 2, and examines possible sex differences in hand-energy registration. It can be seen that males and females performed comparably, their average performance being 67.5% and 65.2% respectively. It can also be seen that males and females estimated their performance comparably, their average estimates being 54.1% and 53.8% respectively. Whereas the main effect for Measure was highly significant ($F [1,59] = 19.30, p < .00005$), there were no significant effects for sex ($p < .71$).

Figure 4 combines Experiments 1 and 2, and examines possible sex differences in confidence ratings. It can be seen that males and females had comparable confidence ratings ($p < .69$), and both groups gave higher confidence ratings for correct versus incorrect trials ($F [1,58] = 12.71, p < .0007$).

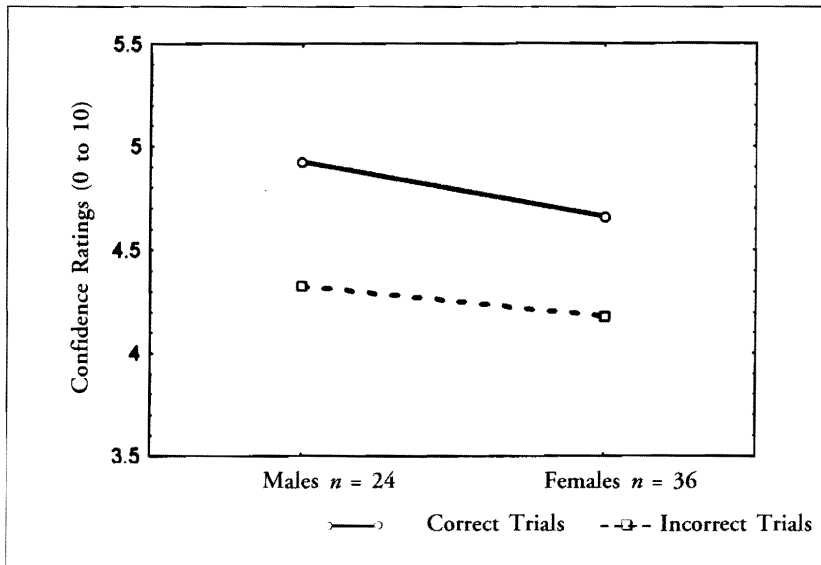


Figure 4. Confidence on Correct and Incorrect Trials in Males and Females

Figures 5 and 6 present histograms of the performance and estimate data for the total sample ($n = 61$). The distributions show that performance data are roughly bell shaped and centered around 65-70%, the estimation data are also roughly bell shaped, with a somewhat greater range, centered around 50-55%. To examine the relationship between performance and perception (estimates and confidence), the total sample was split into four groups (poor $n = 14$, low $n = 7$, medium $n = 27$, and high $n = 13$) based on performance: poor [$< 50\%$], low [50% to 67%], medium [68% to 78%], high [$> 78\%$].

Figure 7 displays the performance and estimation data for the four performance groups. The average hand-energy registration for the four groups was 43.8%, 58.9%, 70.2% and 85.6% respectively. Interesting, the poor and low performance groups correctly estimated their actual performance, whereas the medium and high performance groups clearly underestimated their performance (*i.e.*, low, medium and high performance subjects all estimated their performance at approximately 57%) (the interaction of Group and Measure was $F [3,57] = 5.69$, $p < .002$). Subject's awareness of hand-energy registration, at least in an unselected (and untrained sample), is clearly limited.

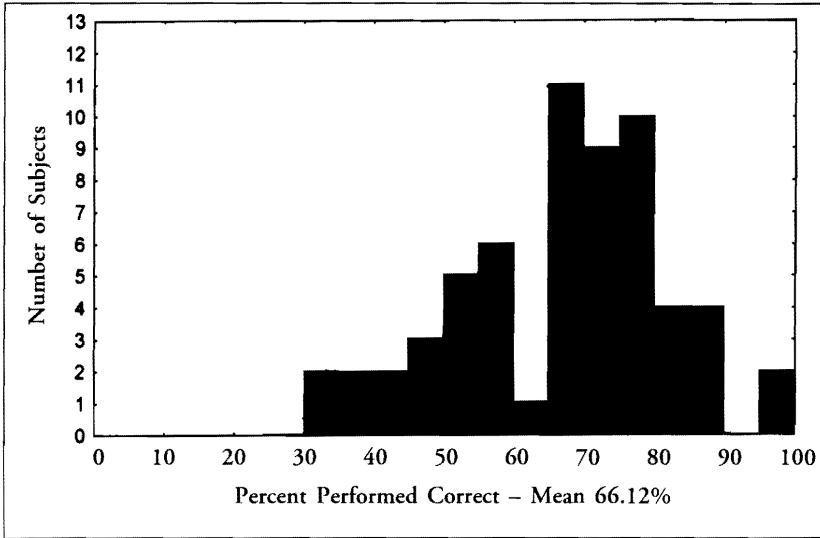


Figure 5. Histogram of Performance Scores.

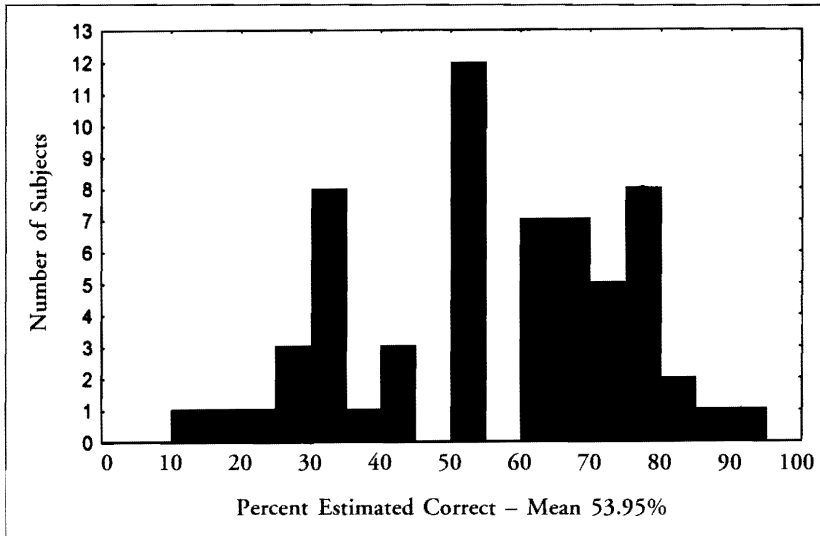


Figure 6. Histogram of Estimation Scores.

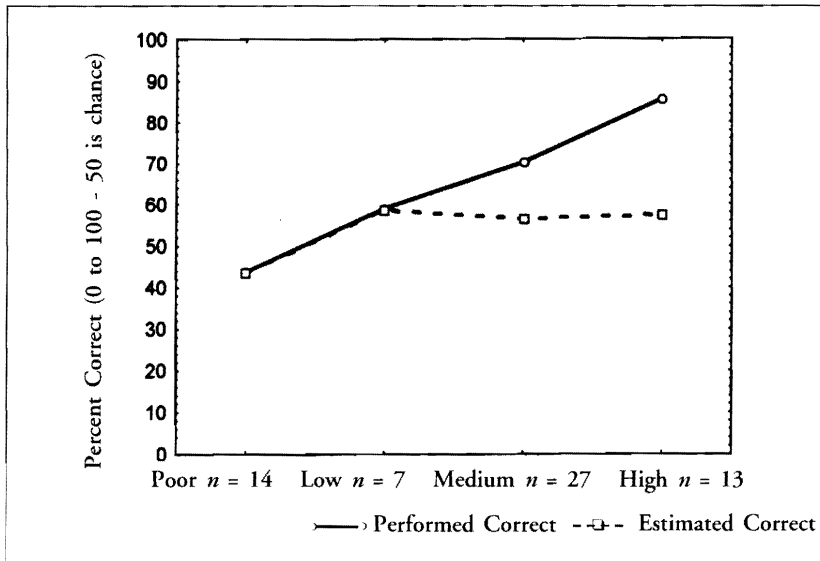


Figure 7. Performance and estimation in poor, low, medium and high performance groups.

Figure 8 displays the confidence data for the four performance groups. It can be seen that even poor and low performance groups gave higher confidence ratings for correct trials than incorrect trials (main effect for Correct/Incorrect $F [1,56] = 10.66, p < .002$). Though the means suggest that the higher performance groups gave higher confidence ratings in general than the lower performance groups, the main effect for groups was not significant ($p < .58$). Despite the fact that low and poor performance groups guessed at around chance levels, their confidence ratings suggest that they have some implicit intuitive awareness of the presence of the experimenter's hand-energy.

At the end of the experiment, subjects were asked "did you have any sensations or feelings in your hands (or other parts of your body) when you were more confident?" Subject's responses fell into three categories of responses (1) temperature (mostly warmth), (2) tingling, and (3) pressure. Figure 9 displays the percent of subjects reporting each of these sensations for the four performance groups. It can be seen that the most frequent category was temperature and the least frequent category was pressure (main effect for Category $F [2,114]$

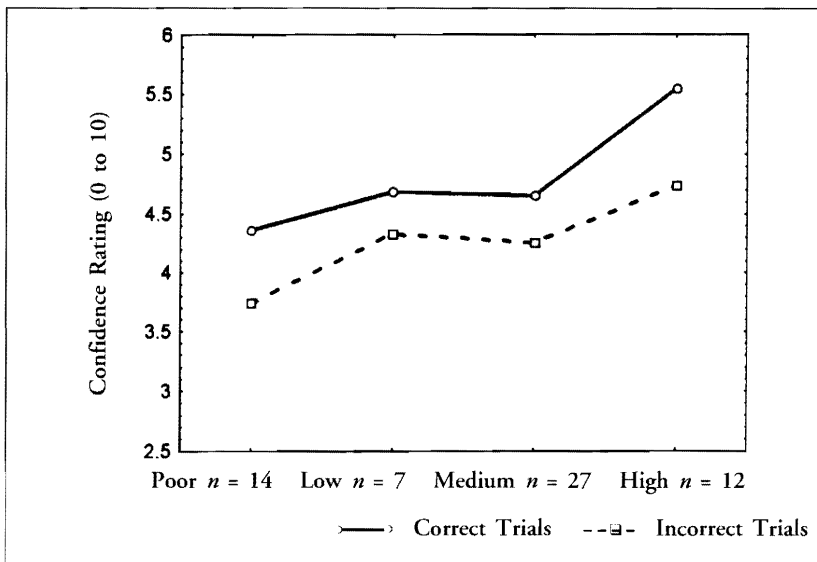


Figure 8. Confidence on correct and incorrect trials in poor, low, medium and high performance groups.

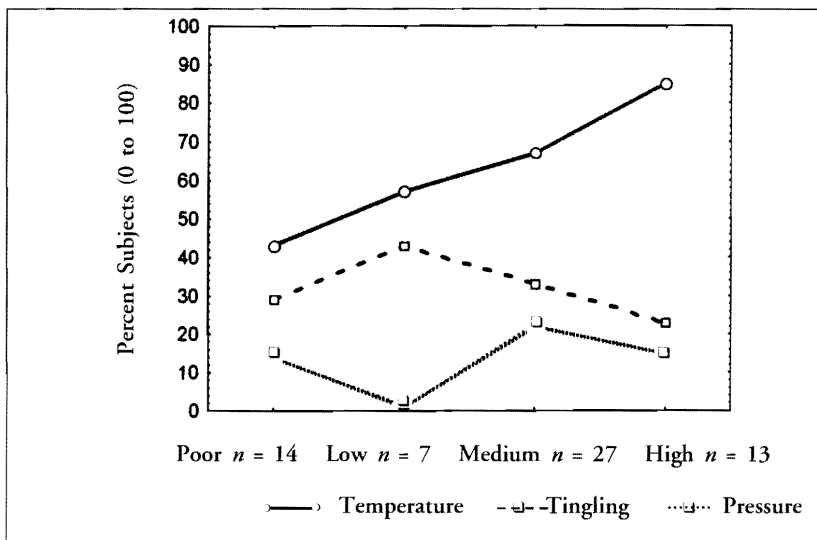


Figure 9. Percentage of subjects reporting temperature, tingling and pressure in poor, low, medium and high performance groups.

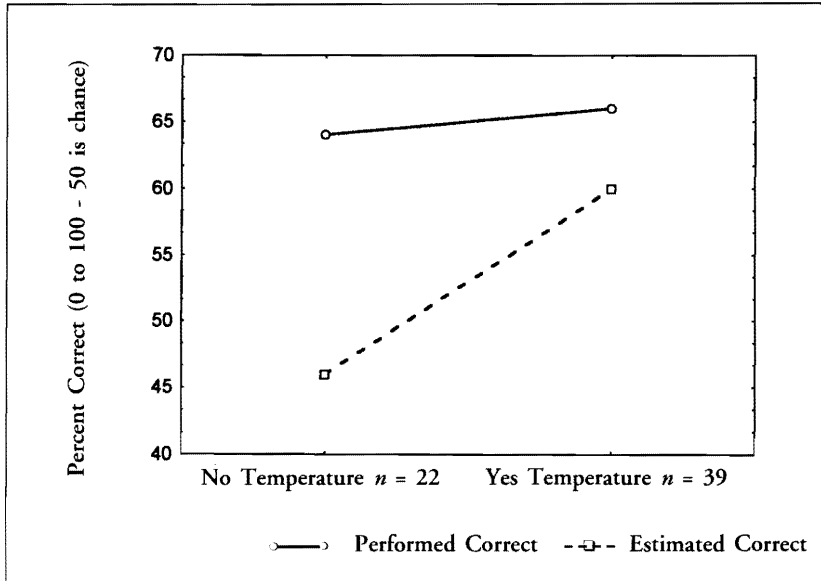


Figure 10. Performance and estimation in subjects reporting sensations of temperature..

=14.52, $p < .000002$). Though the means suggest that higher performance groups mentioned temperature more frequently than lower performance groups, whereas the other categories were unrelated to performance, the interaction of Groups and Categories was not significant ($p < .46$), possibly due to low power.

Figure 10 separates the subjects into those who reported temperature ($n = 39$) and those who did not report temperature ($n = 21$) for the performance and estimation data. It can be seen that the performance scores are virtually the same, whereas the estimation scores are much lower in subjects not reporting temperature compared to subjects who did report temperature (interaction of Temperature Yes/No by Measure F [1,59] = 8.99, $p < .004$). The perception of temperature seems to be related to the perception of estimated performance, and not related to overt hand-energy registration.

Figure 11 displays the confidence ratings for correct and incorrect trials separately for subjects who did and did not report temperature. It can be seen that confidence ratings were similar for subjects who did and did not report

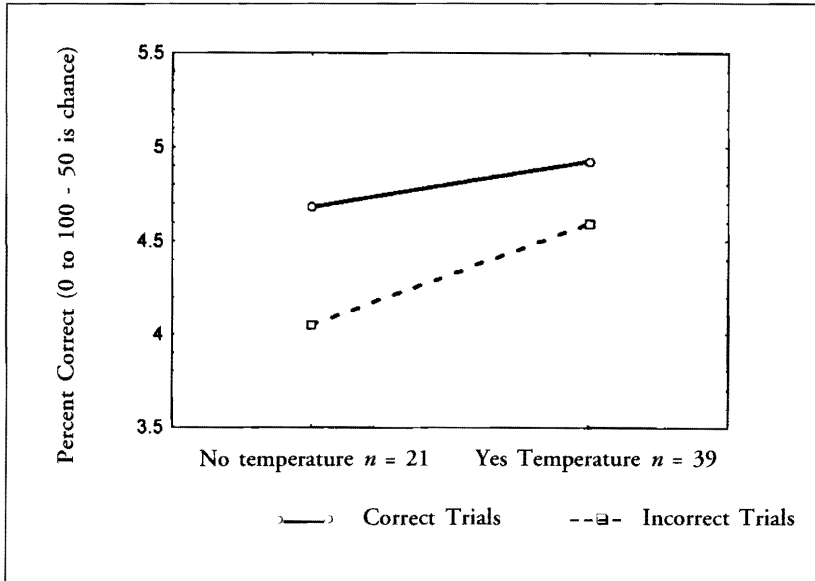


Figure 11. Confidence on correct and incorrect trials in subjects reporting sensations of temperature.

temperature ($p < .46$), and that both groups gave higher confidence scores for correct versus incorrect trials ($F [1,58] = 9.78, p < .003$). The perception of temperature was unrelated to the implicit awareness of hand-energy inferred from the confidence ratings.

DISCUSSION

The present findings indicate that blindfolded subjects can correctly detect, at greater than chance levels, the presence of an experimenter's hand placed a few inches above their hands. Their overall performance (66%) was generally low but highly reliable for the sample as a whole ($p < .00001$). Forty-seven out of 61 subjects performed higher than 50% (chance).

Subject's awareness of their performance was minimal. Even subjects who performed at moderate or high levels estimated their performance, on the average, at just above chance. It appears that unselected subjects are relatively

unaware that they have the ability to detect the presence of someone else's hands with their hands. However, evidence for performance in the relative absence of perception (termed implicit perception) is becoming well documented in cognitive neuroscience. Subjects can visually detect objects they do not report seeing, they can kinesthetically detect pressure they do not report feeling, and they can detect odors they do not report smelling (see Schwartz).⁷

The findings of the present experiment suggest that interpersonal hand-energy registration, and possibly interpersonal energy registration in general, may typically be implicit rather than explicit. Although none of the Harvard men in the 42 year follow-up reported that they sensed the experimenter's heart energy in their brains,⁵ it is conceivable that some of them might have been able to detect the presence of the experimenter's heart beat if given the opportunity.

The findings for confidence ratings per trial are especially intriguing. Similar to the findings reported for subthreshold odors,^{6,7} ratings of confidence may be higher for correct versus incorrect detections, even in subjects who are performing at chance levels. Subtle but reliable differences in perception of confidence can be observed using ratings obtained over many trials. Schwartz, in his analysis of levels of awareness, has suggested that awareness may be influenced by the presence of a stimulus (energy) even though a person may not be aware of the stimulus and therefore will not be aware that her or his awareness has been influenced by the stimulus (energy).⁷ This "awareness without awareness," termed Level 1 Awareness, or "pure awareness" may reflect the foundation of conscious experience and reflect intuitive awareness.

The findings for temperature are also intriguing but limited. Using a simple self-report of spontaneous sensations associated with confidence, it was found that reports of temperature were not associated with overall performance, and they also were not associated with confidence measures of actual performance, but they were associated with estimates of overall performance. It is reasonable to speculate that temperature (infrared) generation and registration may be one of (but not necessarily the only) mechanisms of hand-energy registration. S. A. Schwartz *et. al.*, have reported data suggesting infrared spectra alteration in water proximate to the palms of NCTT practitioners.⁸ Future research should obtain ratings of temperature (and other sensations) over many

trials in a manner similar to the procedure used for obtaining sensitive measures of confidence over trials.

Since the subjects were not wearing headphones with white noise in this study, it is possible that subtle audible cues could conceivably have contributed to the performance effects observed (though no subjects mentioned this possibility). Also, it is conceivable that micro-breezes may have contributed to the performance effects observed (trial by trial temperature ratings will be necessary to uncover potential awareness of such an effect).

Future research can systematically manipulate variables to tease out the possible mechanisms involved. For example, glass can be placed above the subject's hands, reducing temperature effects but allowing electromagnetic and electrostatic effects to occur. Also, wire mesh electrically grounded can be placed above the subject's hands, reducing electromagnetic and electrostatics but allowing temperature effects to occur. Variables such as distance, speed of movement, intention (for example, the experimenter's intention to place her or his left or right hand over the subject's left or right hand), and connection (for example, do loving relationships increase hand-energy registration) can be examined experimentally. If Hypothesis Three (energy is emitted from dynamical energy systems in patterns) from Table 1 is correct, future research will need to examine possible emergent interactions that occur as energy operates holistically.

The present findings documenting interpersonal hand-energy registration, when viewed within the context of dynamical energy systems theory,^{4,5} provide an empirical and conceptual foundation for accepting some of the controversial claims of NCTT and related therapeutic approaches.⁹ Future research in NCTT might profit from quantifying known energy sources generated by the hands and examining their relationship to therapeutic outcome.

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