

DOUBLE-BLIND TEST OF THE EFFECTS OF DISTANT INTENTION ON WATER CRYSTAL FORMATION

Dean Radin, PhD,^{1#} Gail Hayssen,¹ Masaru Emoto, BA,² and Takashige Kizu, BA²

The hypothesis that water “treated” with intention can affect ice crystals formed from that water was pilot tested under double-blind conditions. A group of approximately 2,000 people in Tokyo focused positive intentions toward water samples located inside an electromagnetically shielded room in California. That group was unaware of similar water samples set aside in a different location as controls. Ice crystals formed from both sets of

water samples were blindly identified and photographed by an analyst, and the resulting images were blindly assessed for aesthetic appeal by 100 independent judges. Results indicated that crystals from the treated water were given higher scores for aesthetic appeal than those from the control water ($P = .001$, one-tailed), lending support to the hypothesis.

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INTRODUCTION

Experiments over the past four decades have investigated whether intention affects properties of water. This question is of interest to complementary and alternative medicine research, and especially for therapies involving intention, because the adult human body consists of approximately 70% water.¹ The question has been studied by comparing the effects of intentionally “treated” water versus untreated control water on the germination and growth of plants, including barley,²⁻⁴ wheat,⁵ rye,⁶ beans,⁷ cress,⁸ radishes,⁹ and lettuce.¹⁰ Other properties of water that have been examined include rate of cooling,¹¹ molecular bonding as reflected by infrared spectra alterations,¹²⁻¹⁶ Raman spectroscopy,¹⁷ scattered laser light,¹⁸ and pH level.¹⁹ Although formal metaanalyses have not been performed on these studies, overall, the experiments provide evidence suggesting that various properties of water may be influenced by intention.

Interest in this topic has been rekindled recently by claims suggesting that intentionally influenced water can be detected by examining ice crystals formed from samples of that water.^{20,21} The specific claim is that positive intentions tend to produce symmetric, well-formed, aesthetically pleasing crystals, and negative intentions tend to produce asymmetric, poorly formed, unattractive crystals.

As of this study, no experimental replications of these claims have been published in peer-reviewed journals, so most critiques have assumed that the simplest explanation for the claimed results is either biased selection of crystal images or selective reporting of results or both.²² This paper reports a pilot investigation of the crystal formation hypothesis to test the claim under double-blind conditions.

METHODS

Water Sample Preparation

In preparation for the experiment, the second author (G.H.) purchased four plastic bottles of Fiji brand commercial bottled water (Los Angeles, CA). This brand was selected because, unlike many other bottled waters, after the Fiji label was removed, the plastic bottle contained no words, symbols, or other shapes embossed in the plastic. The first author (D.R.) randomly assigned the bottles with labels A through D (using a tossed die), and, with G.H., he selected two of those bottles to be the “treated” samples (randomly selected as A and B); the remaining two bottles were set aside as controls (C and D).

The treatment bottles were placed inside a double-steel-walled, electromagnetically shielded room (Series 81 Solid Cell; Lindgren/ETS, Cedar Park, TX) at the Institute of Noetic Sciences (IONS) in Petaluma, California. This room was used primarily as a convenient, limited-access location in which to place the bottles during the remote treatment period. The control bottles were placed in separate cardboard boxes and stored on a desk in a quiet location on another floor of the building that housed the shielded room. D.R. and G.H. did not inform the third or fourth authors (M.E. or T.K.) about the existence of the control bottles until after the treatment period was completed.

A digital photo of the two treatment bottles in the shielded chamber was e-mailed to M.E. and T.K. in Tokyo to be used as a visual aid for a group that would later be directing their intentions toward those bottles. The treatment and control bottles were maintained at approximately the same temperatures and were handled approximately the same length of time.

Treatment

On November 16, 2005, M.E. led a group of approximately 2,000 people in Tokyo in a prayer of gratitude directed toward the water in the IONS laboratory, some 5,000 miles away. M.E. showed the audience where the IONS laboratory was located in relationship to Tokyo by using a sequence of images from the Google Earth global mapping application (Mountain View, CA). Next, he showed the digital picture of the bottles inside the

1 Institute of Noetic Sciences, Petaluma, CA

2 IHM Research Institute, Tokyo, Japan.

Corresponding author. Address:

101 San Antonio Road, Petaluma, CA 94952.

e-mail: dean@noetic.org.

Table 1. Comparison of the Grand Mean Ratings for Aesthetic Appeal of the Treated vs Control Crystals by 100 Independent, Blind Judges

Aesthetic Appeal Ratings	Treated	Control
Mean	2.87	1.88
Variance	0.89	0.91
Observations	24	16
Pooled Variance	0.90	
Hypothesized mean difference	0	
df	38	
<i>t</i> test	3.27	
<i>P</i> value, one-tail	0.001	

shielded chamber with the words of an intentional “prayer for water” overlaid on the photo. After explaining the photo and purpose of the experiment, M.E. led the group in speaking aloud the words of the prayer. This lasted approximately 5 minutes.

Analysis

The day after the conference, D.R. and G.H. retrieved all four bottles and wrapped them in identical sheets of aluminum foil and bubble wrap, placed each bottle in a separate box labeled A through D as appropriate, and mailed the four boxes to M.E.’s laboratory. (The treatment and control bottles were in their separate locations for approximately 36 hours before being brought together again for packaging.) The bubble wrap and aluminum foil were used to provide a rudimentary shield against sudden shocks, ambient light, and electromagnetic fields that might have impinged on the bottles while en route to Japan. Each box was packaged separately to avoid the possibility that treated bottles might influence the control bottles through close proximity. After mailing the boxes, D.R. and G.H. informed M.E. and T.K. about the two control bottles, but they were not told the conditions of the four bottles to ensure that their analysis would be conducted blindly.

Upon receiving the four boxes, T.K. examined water samples from each bottle according to the following procedure:

1. For each bottle, approximately 0.5 mL of water was placed into each of 50 Petri dishes, and a lid was placed on each dish.
2. Each dish was then placed into a freezer maintained at -25 to -30°C for a minimum of 3 hours.
3. T.K. later removed the dishes from the freezer, and, in a walk-in refrigerator (maintained at -5°C), he examined the apex of each resulting ice drop for a crystal using a stereo optical microscope. Previous experience with ice drops formed under these conditions indicated that the apex was the location where crystals were most likely to form. Crystals were defined as hexagonal shapes.
4. If a crystal was observed at the apex (not all ice drops formed discernable crystals), T.K. photographed it at either $\times 100$ or $\times 200$ magnification, depending on the size of the crystal.
5. All resulting photographs, from all four bottles, were then e-mailed to D.R.

RESULTS

Analysis of Crystals

D.R. received a total of 40 photographs: 12 crystals were from bottle A, 12 from B, 7 from C, and 9 from D. Bottles A and B were the treated bottles, thus slightly more crystals were identified in the treated condition. To assess the aesthetic appeal of these 40 crystals, a group of 100 volunteers were recruited over the Internet to blindly and independently rate each crystal, one at a time, on a scale from zero to six, where zero meant “not beautiful” and six meant “very beautiful.” (The ratings were collected via a Web site programmed in Perl/CGI by the first author.) Beautiful crystals were defined as symmetric, aesthetically pleasing shapes.

The order in which each image was presented to each judge (via a Web page) was independently randomized. In addition, the image titles (eg, “2.jpg,” “3.jpg”) were assigned random numbers so the condition could not be inferred by examining the name of the crystal image and the condition (treated vs control) from which each crystal was formed was not indicated, and no feedback was provided at the end of the assessment exercise to prevent judges from learning which images corresponded to which conditions. The planned analysis was based on the first 100 judges to complete ratings of all 40 crystals, for a total of 4,000 contributed ratings.

Comparison of Ratings

Comparison of the mean ratings assigned to the images showed that the crystals from the treated water were rated significantly higher for aesthetic appeal than the crystals from the control water ($P = .001$, one-tailed), as shown in Table 1 and Figure 1.

DISCUSSION

This pilot study was designed to test the most plausible conventional explanation for the crystal formation claim: the presence of subjective biases. To eliminate these biases, the person taking photos of the crystals (T.K.) and the aesthetic raters of those crystals were both blind to the treatment versus control conditions. The results were consistent with the hypothesis that water

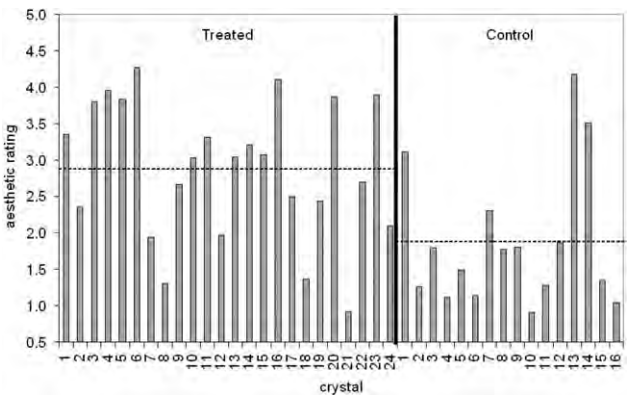


Figure 1. Mean aesthetic ratings by 100 independent judges blind to the condition of each image, for 40 crystals blindly identified by an analyst. Grand means for the 24 treated and 16 control samples are identified with dashed lines.

treated with pleasant intentions would result in more pleasing crystal shapes. If this effect was not due to obvious subjective biases, then what else might have accounted for the results?

Could the image assessment process have introduced a systematic rating bias? This question arises because each rater examined 40 crystal photos without prior training on the meaning of "aesthetically beautiful." If the sequence in which raters observed these images was in a fixed order, then this might well have introduced an artifact. However, this possibility was specifically prevented by presenting the images in a newly randomized order for each rater, thus averaging out potential sequential effects.

Another concern may be that the scales used to assess beauty, which were based on ordinal rather than interval measurements, violated the *t* test assumption of an underlying normal distribution. This potential problem was ameliorated by using scores averaged across 100 raters, but parametric assumptions can be completely avoided by using a nonparametric statistic.²³ The method we used compared the observed mean difference in ratings between treated and control crystal images to the same mean difference determined after randomly reassigning which images belonged to the treated and control conditions. The original mean difference was larger than 999 out of 1,000 randomly reassigned differences, thus the associated *P* value was *P* = .001, virtually identical to the results of the *t* test.

One might ask whether a new group of raters would replicate the initial results. This was tested by examining the results provided by 100 additional raters. The resulting *t* test was *t* (38 df) = 3.11, *P* = .002, confirming the original findings.

Perhaps the treated and control bottles were handled differently (say, with more fingerprints on the treated bottles), and the analyst (T.K.) detected those differences and was subsequently biased. Anticipating such artifacts, investigators D.R. and G.H. took care to ensure that the four bottles were physically handled the same way and then packaged identically. A related question is whether the treated and control environments might have differed in important ways. The treated bottles were in an electromagnetically shielded room during the treatment period, but the control bottles were not. In addition, that shielded room had been used exclusively for intention-related experiments for several years prior to this experiment. It is conceivable that purported "space conditioning" effects, as reported in previous intention studies, or simply differences in exposure to ambient electromagnetic radiation, may have played a role in the present outcome.^{18,24}

Future studies would also benefit by assessing photographs of the apexes of all available ice drops rather than just those with crystalline shapes because this would eliminate all subjective (albeit blind) assessments on the part of the analyst. The Petri dishes from different water samples might also be randomly distributed inside the freezer to avoid any inherent temperature or position differences, and more objective methods of assessing the aesthetic properties of the crystals could be employed.^{25,26}

There are at least three unconventional alternatives that might explain the observed effects. One is that the intentional source was not the audience in Tokyo but rather D.R. and G.H. This possibility cannot be excluded, but, although these investigators were open to the hypothesis, neither held strong expectations about the experimental outcome. A second pos-

sibility is that the water was not altered at all, but rather the bottles were randomly assigned by D.R. and G.H. to the two conditions that would later result in a fortuitous differential effect or that T.K. fortuitously decided to take photos that would ultimately result in the observed outcome or both. Such anomalous assignment effects, formalized as "Decision Augmentation Theory,"²⁷ require the ability to unconsciously sense and act upon future possibilities, ie, a form of precognition. A third possibility is that the intentions of future observers (including readers of this article) *retroactively* influenced the water. Although this explanation may seem outrageous, there is experimental evidence suggesting that such time-reversed effects may exist.²⁸

In conclusion, the present pilot results are consistent with a number of previous studies suggesting that intention may be able to influence the structure of water. Future replications should concentrate on eliminating all conceivable conventional artifacts, and protocols should be employed that can help discriminate among the various unconventional explanations.

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