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A Pilot Study of Distant 'Mind-Matter' Interaction with Digital Photography

Modern Thoughtography: Mind Interaction at a distance with digital camera sensors. A pilot study

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Abstract

The aim of this pilot study was to determine the possibility of mentally producing, from a geographical distance, predefined images on modern digital sensors of professional commercial photographic cameras, and to do it sufficiently well for the images to be recognized by a special software.

Three participants experienced in distant mind-matter interaction techniques took part in a total of 48 trials.

In 7 out of 48 trials (14.5%) the value of the Structural Similarity Index of the target image chosen by the participant for the distant mental influence trial on the camera's sensor was greater than that obtained when the target was different.

Although still preliminary, these results suggest that it may be possible to use modern professional cameras to study the effects of distant mind-matter interactions.

Keywords: mind-matter interaction, digital photo-sensor, photographic camera

Introduction

The main purpose of this pilot study was to verify the possibility of mentally and distantly influencing the digital sensor of a professional photographic camera to make a pre-chosen image appear on it.
This study is part of a rich field of research on mind-matter interaction which by now has an approximately 70 year history, as documented and presented by Duggan (2017).
According to the literature, this interaction could be on macroscopic objects like dice (Radin and Ferrari, 1991), microscopic objects like electrons in a random number generator (Bösch, Steinkamp, & Boller, 2006) and photons (Radin, Michel, & Delorme, 2016; Tressoldi, Pederzoli, Matteoli, Prati & Kruth, 2016), or organic material (Roe, Sonnex, & Roxburgh, 2014).

In this case here it was decided to verify the possibility of influencing sensors of modern professional photographic cameras specifically because they now have a large number of pixels and each pixel also has a very high signal/noise ratio, so that for each pixel we can record a brightness range of 12 bits, or 4096 different values.

In the past, this type of mental influence was called "Thoughtography" and is even mentioned in Wikipedia[1]. However, as we see from a review by Willis (2015), there are no other relevant studies except for some documentation gathered by Eisenbud (1967) on work by Ted Serios, who attempted to reproduce mental images on photos from a Polaroid camera.

Methods

Participants

The participants were three adult males with an average age of 67 years, ranging from 64 to 73 years, part of EvanLab's group of experts in distant mind-matter interaction techniques. Each participant was asked to complete at least one series of ten trials, each trial lasting 18 minutes. Two participants performed two series each, and the other performed one series only, totalling 50 trials in all.

Equipment

The equipment used in this study was the body of a professional NIKON D850[2] photographic camera, automatically activated by a timer device constructed ad hoc (see description at https://doi.org/10.6084/m9.figshare.12151932.v5), which counted the number of images to shoot, their exposure times, as well as the intervals between them.

After many preliminary trials it was decided to collect 36 images for each trial, each with an exposure time of 29 seconds and spaced 1 second from the next, for a total of 18 minutes. During all trials the camera's original black plastic lens cap replaced the lens to prevent any light entering, and the viewfinder's shutter was closed.

[1] https://en.wikipedia.org/wiki/Thoughtography
[2] https://www.nikonusa.com/en/nikon-products/product/dslr-cameras/d850.html

Furthermore, the camera body was wrapped in a thick black cloth from which only the connection cable to the timer device emerged; the camera body in its cloth was then placed inside a metal box.

Procedure

For each trial, each participant would arrange a suitable day and time with the research manager (tasked with overseeing the camera) in which to connect via Skype in order to ensure the best psycho-physical conditions for the task at hand.

A single trial consisted of 36 shutter clicks with a 29 sec exposure at 1 sec intervals, totalling 36 clicks (snapshots) in 18 minutes. Of the 36 shots, the first 10 were considered to be pre-influence controls, the next three shots were set aside for the target image being sent, the next 10 shots set aside for the influence attempt on the camera's sensor, the following 3 shots were for withdrawal from the concentration state (relax), and the last 10 shots were for post-influence controls (see Table 1).

Table 1: Roles assigned to the 36 shutter clicks (snapshots) for each trial

<table>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td></tr>
<tr><td colspan="10">PRE-MENTAL INFL. (5 min.)</td><td colspan="3">TARGET SEL.</td><td colspan="10">MENTAL INFL. (5 min.)</td><td colspan="3">RELAX</td><td colspan="10">POST-MENTAL INFL. (5 min.)</td></tr>
</table>

At the pre-arranged time, the research manager called the participant via Skype, started the timer and after 5 minutes signalled the start of the influence attempt for the image chosen by the participant. At the appropriate time he would signal the end of the influence period and, after the post-influence phase, memorize the image used in the trial.

Each participant was encouraged to use whatever he considered the most suitable method to produce an image on the camera's sensor; the image was freely chosen from a group of 11 shown previously to participants, which can be viewed at:
https://doi.org/10.6084/m9.figshare.12151932.v2 .

During the influence attempt, the participant could choose to either look at the image on his computer screen, look at it printed on paper, or just mentally imagine it.
At the conclusion of the 5 minutes of influence, the research manager advised the participant that the trial had ended and organized an appointment for the next trial.

Data Analyses

The 36 photos from each trial were saved in .NEF format and immediately sent to the research assistant to be processed.
Each photo was then changed to a .DNG format (digital-negative) using Adobe DNG Converter freeware.

Subsequently, each photo was changed into a 32x32 pixel format using a program created ad hoc with Matlab available at https://github.com/mbilucaglia/PsyCam applying a pixel binning operation to increase the signal/noise ratio (Jin and Hirakawa, 2012).

Binning refers to the combining of the electrical signal deriving from charges of neighbouring pixels together to form a superpixel. We chose to implement an average on blocks of size [L/l]*[M/m], where L * M is the image's original resolution and l * m is the image's final resolution. The final .DNG image is not in colour, but it is the original matrix (monochromatic) before the interpolation algorithm was applied, to give each trichromic pixel its red, green and blue values. Binning produces an improvement of the signal/noise ratio by a factor of log(N), where N is the maximum number of pixels chosen.

Finally, still using the Matlab's ad hoc program available at https://github.com/mbilucaglia/PsyCam, for each of the 36 photos in each trial the Structural Similarity Index (SSIM) was calculated with respect to all 11 target images (Brunet, Vrscay, & Wang, 2012)
The following is a brief description of the SSIM procedure (Wang, Bovik, Sheikh & Simoncelli, 2004):
Given two equally sized $(m * n)$ images I and J, their Structure SIMilarity Index (SSIM) is given by:

$$SSIM(I,J) = [l(I,J)]^{\alpha} \cdot [c(I,J)]^{\beta} \cdot [s(I,J)]^{\gamma}$$

$l(I,J) = \frac{2\mu_I\mu_J + C_1}{\mu_I^2 + \mu_J^2 + C_1}$ is the luminance term;
$c(I,J) = \frac{2\sigma_I\sigma_J + C_2}{\sigma_I^2 + \sigma_J^2 + C_2}$ is the contrast term;
$s(I,J) = \frac{\sigma_{IJ} + C_3}{\sigma_X\sigma_Y + C_3}$ is the structural term;

α, β, γ are the luminance, contrast and structural exponents that can be varied to individually enhance (>1) or attenuate (<1) each term;
C_1, C_2, C_3 are the regularization constants for luminance, contrast and structural terms;
$\mu_X = \frac{1}{(mn)} \sum_{\substack{k=1 \\ l=1}}^{\substack{l=m \\ k=m}} X(k,l)$ is the mean value of image X;
$\sigma_X^2 = \frac{1}{(mn-1)} \sum_{\substack{k=1 \\ l=1}}^{\substack{l=m \\ k=m}} (X(k,l) - \mu_X)^2$ is the variance of image X;
$\sigma_{XY}^2 = \frac{1}{(mn-1)} \sum_{\substack{k=1 \\ l=1}}^{\substack{l=m \\ k=m}} (X(k,l) - \mu_X)(Y(k,l) - \mu_Y)$ is the covariance between images X, Y.
From the definition, SSIM is a "global" value, since it is based on "global" measurements (i.e. sample means, sample variances and covariance).
In order to obtain a "local" (i.e. at pixel level) value, a local $ssim(k,l)$ of the images I and J is calculated by multiplying both with a 2D gaussian kernel $N(1,s)$ centred on the pixel (k,l). The local $ssim(k,l)$ can be displayed as a similarity image.
The global SSIM is thus obtained by averaging the local $ssim(k,l)$ as follows:

$$SSIM = \frac{1}{mn} \sum_{\substack{k=1 \\ l=1}}^{\substack{n \\ m}} ssim(k,l)$$

SSIM has the following properties (Brunet, Vrscay & Zhou Wang, 2012):

- Symmetry: $SSIM(I,J) = SSIM(J,I)$
- Boundness: $-1 \leq SSIM(I,J) \leq 1$
- $SSIM(I,J) = 1 \Leftrightarrow I = J$. Additionally, $SSIM(I,J)$ approaches 1 the closer I is to J.

Results

Two of the original 50 trials were discarded because the images were damaged due to technical problems. The analysis therefore consisted of 48 trials, with a total of 1728 images (48 x 36). To verify whether or not the different participants' intention to make a specific target image appear on the sensor was effective, it was decided to compare the SSIM value of the target image chosen for the influence attempt to its SSIM value when it was not used in that attempt.

For example, if the participant chose a circle as the target image, to determine if the interaction was successful, the circle's SSIM value should be greater than when another image was chosen as target.

Using all three parameters of the SSIM, i.e. brightness, contrast and structural terms, in no trial the value of the SSIM of the target image was greater than the SSIM value of the other images.

However, when the brightness parameter was removed, the SSIM value of the target image was greater in 7 out of 48 trials (14.5%). Given that, we compared the SSIM values up the sixth decimal place, the probability of this occurring by chance is 1/1.000.000.

The act of mental intention therefore seems to only affect contrast parameters and structural similarity and not the degree of brightness; this fact, if confirmed, will be useful from a theoretical point of view in order to understand how mental intention translates to the physical plane.

This result was achieved with the contribution of all three participants. The target images with the highest SSIM values were: circle (once), the letter E (once), the letter H (once), the π symbol (once), a triangle (once), and the letter X (twice).

In addition to the SSIM value of images, corresponding images with false colours were created using the HSV function of Colormap in Matlab[3]. In practice, when the minimum and maximum values of each image were established (from 0.001 to 0.007 inclusive), the 256 available RGB colours were assigned (Red, Green, Blue) from red for minimum values up to violet for maximum values.

An example is shown in Figure 1 (all target images are available at https://doi.org/10.6084/m9.figshare.12151932.v5), whereas Table 2 presents the corresponding SSIM values and the trial phase from which they were obtained.

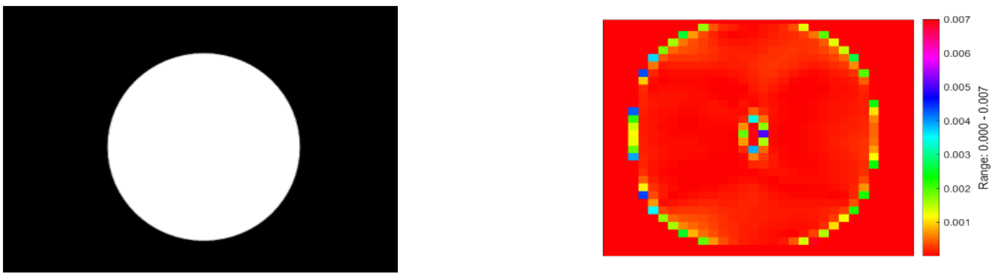

Figure 1: Image of the target circle (on the left) and of the image with the highest SSIM when participant 1 attempted to make it appear on the sensor by way of intention.

[3] https://www.mathworks.com/help/matlab/ref/colormap.html#buc3wsn-1-map

Table 2: SSIM values related to the target images which obtained the highest value in agreement with the intention of the participants.

Target Image	Circle	E	H	Pi	Triangle	X	X
SSIM	.305248	.094968	.081082	.082492	.173562	.223495	.223644
Trial phase	pre	pre	pre	pre	infl	pre	pre

Comment

If we consider that the optimal SSIM value is 1, it shows that mental influence is very weak even if sufficient to be detected.

Discussion

The aim of this pilot study was to verify the possibility of mentally influencing from a distance the digital sensor of a commercial professional photographic camera, imprinting predetermined images on it.
The results appear encouraging and the procedure used can be easily reproduced independently by those who intend conducting research on this phenomenon with interesting potential applications.

Since the image formed on a camera's sensor via the conversion of photons to electrons during a trial is transformed into a sequence of bytes recorded on a digital memory card in the camera itself (a certain number of bytes for each photo snapshot), strictly speaking we can't know if the intended influence acted on the sensor or the memory card, even if actually influencing the byte sequence recorded on the card so as to obtain the desired image is highly improbable.

Furthermore the energy needed to change the value of a bit from 0 to 1 or vice versa on a memory card is much greater than that needed to produce a small signal on a sensor's pixel. The software program used in this study is able to greatly amplify the sensor's sensitivity – at the expense of definition – and so, even if for the purpose of mind-matter interaction it doesn't matter which camera part is acted on, we can essentially exclude that what was measured in this study originated on the memory card.

It is also of interest that the results obtained were accentuated using only the contrast and structural feature parameters of the SSIM index, discarding the brightness parameter. It would appear therefore that mental intent only acts upon parameters defining the target image's outline and not on its brightness gradient. Obviously this interpretation only applies to the target images used in this study.

If confirmed by future studies, we should understand why the mental influence mostly appears before the deliberate intention phase. At present, our data suggest it is sufficient to influence the camera sensor just thinking about the target image and not necessarily focusing on it.

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