Experimental

ANOMALOUS ENVIRONMENTAL INFLUENCES ON IN VITRO ENZYME STUDIES

Part 2: Some Electronic Device Effects

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ABSTRACT

In this papet we continue our experimental exploration of the connection between a small vessel containing an in vitro enzyme—alkaline phosphatase (ALP) and its local environment via monitoring the ALP thermodynamic activity as the local environment is changed. Here, we report on the influence of an intention imprinted electronic device (IIED) at various space-time (D-space) locations inside an incubator and inside a Faraday cage in the incubator. The IIED can be either imprinted or not and it can be in the "on" or "off" state. Again, we observed some remarkable and statistically significant effects that appear to have no ready explanation based upon the accepted, present day, scientific paradigm. We found that Faraday cage shielding from ambient environmental EMFs significantly increased ALP activity while the low power/specific frequency EMFs from an unimprinted device significantly reduced ALP activity. Importantly, the specific intention imprint of the IIED more than compensated for these normal EMF effects and increased the ALP activity most of all. Thus, it has been clearly shown that the IIED effects on water and other in vivo biological systems can be extended to an in vitro biological material, the liver enzyme alkaline phosphatase.

KEYWORDS: Enzyme activity, ALP, Faraday Cage, R-Space/D-Space, Interactive Physics

INTRODUCTION

In this paper we continue our experimental exploration of the connection between a small vessel containing an in vitro enzyme--alkaline phosphatase (ALP) and its local environment via monitoring the ALP thermodynamic activity as the local environment is changed. Based on purely space-time (D-space) physics, there should be no change in ALP activity as the environment of the incubator/refrigerator is systematically altered. However, based on reciprocal space/direct space (R-space/D-space) interactive physics, changes can be expected under appropriate conditions. Experimentally, we again find statistically significant changes in ALP activity as the environment of the control vessel is systematically changed.

The thermodynamic activity of the ALP-solution in the control vessel is again utilized as a detector of environmental influences. Here, we report on the influence of an IIED at various D-space locations inside an incubator and inside a Faraday cage in the incubator. The IIED can be either imprinted or not and it can be in the "on" or "off" state.[1-8] This interesting experimental data extends the results obtained in Part I and allows one to learn something about R-space and about the way nature utilizes the R-space/D-space connection to generate physical phenomena.[9]

As indicated in Part I, nature expresses itself at the physical reality level via two very important pathways, (1) a D-space path involving electric monopole, particulate substance that is quantitatively expressed best by using our normal space-time coordinates and (2) an R-space path involving magnetic monopole-generated waves in the vacuum that fills the space within and between the particulate substances.[1-9] This quality of nature is quantitatively expressed best via using a four-dimensional coordinate system where each coordinate is a frequency and is a reciprocal of one of the D-space coordinates. This biconformal base-space (consisting of dual, reciprocal four spaces) is embedded in a higher dimensional framework that connects physical reality to the domain of spirit where all intentions are initiated. This higher dimensional framework is the "womb" for creation of both the biconformal base-space and the two types of monopole substances functioning therein, via what we presently call the "Big Bang" process. This dual pathway for nature's expression of any quality has been captured in the procedures of Quantum Mechanics in the wave/particle duality principle.

In more esoteric literature it has been captured via the physical and etheric domains descriptors. In the future, we will probably refer to it as the Dense Physical and the Refined Physical and recognize that *any* experimental measurement is comprised from two distinct parts, one from D-space and one from R-space. Thus for any unique quality, *j*, any experimental measurement, Q_{Mj}, is expressed as

$$Q_{Mj} = Q_{Dj} + Q_{Rj}$$

In most experimental studies of the past, except those dealing with light, Q_{Rj} has been much smaller than Q_{Dj} and has not been discriminated with respect to Q_{Dj}. However, in experiments dealing with "conditioned" space, wherein the coupling between this biconformal base-space system and the higher dimensional reality has been significantly increased, Q_{Rj} can be comparable to or larger in magnitude than Q_{Dj} and can be readily discriminated from Q_{Dj}.[1] That is what the experiments of this paper and its precursor, Part I, are all about.[9] They are about showing you, the reader, that QMj can be very different than our usual expectations about QDj when such experimental measurements are made in a "conditioned" space.[1] In this way we hope to learn more about Q_{Rj} and to ultimately be able to learn about its quantitative underpinnings in this new, overall frame of reference.

Over the past several years, our research team has been conducting a series of experiments with highly measurable systems investigating the interaction of consciousness, or more specifically intentionality, with the behavior of electronic, electromagnetic and biological systems (both in vitro and in vivo).[1-9] We refer the reader to our recently published book for this and related material.[1]

This article reports on experiments that extend the demonstration of "R-space" physics to in vitro biological systems. Standard "D-space" physics holds that the reaction speed (kinetics) of a biochemical enzymatic reaction should be autonomous and unaffected by seemingly extraneous variables such as time of day, day of week, the presence of other biological reactions or the presence of electromagnetic screening, etc. Part I sets the stage by demonstrating that a variety of parameters do, in fact, make a difference in an enzyme system. This challenges standard scientific paradigms about biological systems being isolated and unaffected by their environment.[9]

The present article further explores the effects of intention implanted by a team of meditators into an electronic device that emits extremely low intensity electromagnetic (EM) fields. "R-space" physics suggests that there are dimensions or qualities of EMF radiation that, while not measured or predicted by standard classical physics, do in fact affect the world around them. In other words, two EM fields may have the same quantitative frequency/power measurements as determined by standard instruments yet have very different qualitative effects on inanimate and biological objects around them based on the specific intentions somehow attached to the EMFs.

EXPERIMENTAL METHODS

ALP Activity

Details are provided in both Part I and Appendices A and B.[9] A brief overview is given here. ALP activity was determined via reflective spectroscopy using the Johnson and Johnson Clinical Diagnostics technique.[10,11] This technique utilizes the Vitros DT60 chemistry system—the DT60II Analyzer and the DTSC II Module.[10,11] Vitros DT Control enzyme solutions, which are available as vials of frozen lyophilate and serum, were utilized as the experimental ALP solutions. These solutions are designed for use in monitoring the precision of this system. ALP was derived from porcine kidney and standard procedures were followed. Reporting units were U/L (where U is the international unit or quantity of enzyme that will catalyze the reaction of one μ mole of substrate per minute and L is litre).

Intention Imprinted Electronic Devices (IIEDs):

IIEDs. We used two physically identical electronic devices which produced EMFs.[1-8] We isolated them from each other and "charged" one with the specific intention for the experiment. The imprinted device was labeled (*d,j*) and the unimprinted, device (*d,o*). The electric circuits involved only an EPROM memory component, an oscillator component (5.0, 8.0 and 9.3 MHz), no intentional antenna, either line voltage or battery power supply and

all are housed in a 17.5 cm x 6.25 cm x 2.5 cm plastic box. The devices radiated electrical power that was less than approximately 1 microwatt at the exposure distances used here.

Intention. The charging process involved the services of four highly qualified meditators to imprint the device with the specific intention (see references 1-4 for a full description). The intention for the experiment was as follows: "increase by a significant factor (as much as possible) the thermodynamic activity coefficient of the specific liver enzyme, ALP. These changes were to occur relative to the same type of experiment conducted with an unimprinted device (*d,o*)."

After the intention imprinting process, the same type of imprinted devices were individually wrapped in Aluminum foil and stored in an electrically grounded Faraday cage. Next, when needed, the Al-foil wrapped devices of the same type and the unimprinted, control device were separately shipped, on different days via Federal Express, to their laboratory destination, approximately 2,000 miles away. On arriving there, they were immediately placed in separate, grounded Faraday cages until use in the actual experiment, which was conducted by others.

Finally, we have assessed specific intention effects in various experimental systems using the same devices and comparing (*d,j*) versus (*d,o*).[1-8] We have observed specific effects in our experimental systems as a consequence of exposure to the electronic devices. Overall, we have found that (d,j) produces (1) significantly shorter development times and higher [ATP]/[ADP] ratios in vivo and in vitro for developing fruit fly larvae and (2) significantly higher ALP activity levels and NAD levels in vitro in comparison to (d,o).[1,4,8] In summary, devices exposed to specific intentions appeared to be able to both store these intentions and transfer them to various experimental systems and influence these systems in the direction of the specific intention.

Finally, we note the history of the devices used here: the devices were charged with the specific intention and placed in the incubator in late February, 1998. They were re-charged with the intention in late July, 1998 and the present experiments were conducted during March and April, 1999. The devices were also used in other experiments and hence, were in the on position for most of the period from July, 1998 to March, 1999.

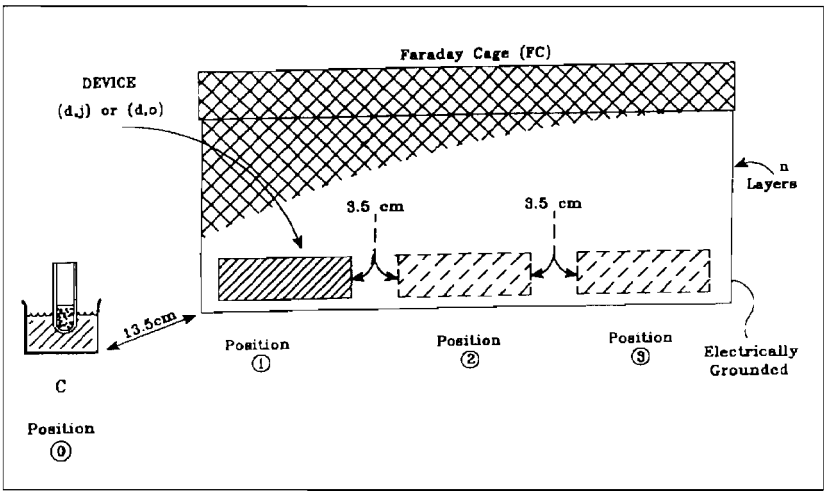

Figure 1. *Experiment configuration with ALP detector (C) at position 0 and devices in the Faraday cage at positions (1), (2) or (3).*

EXPERIMENT: DEVICE, POSITION AND FARADAY CAGE

The basic experimental layout is given in Figure 1 with IIEDs substituted for ALP-solution vessels used in Part I.[9] The distances between positions 1, 2 and 3 were 3.5 cm. In the experiment we added an unimprinted device, (*d,o*) or an imprinted device, (*d,j*) at position 1 and measured ALP activity in (C) for F, n = 0 and 1 with (*d,j*) on or off or with (*d,o*) on or off. These measurements were repeated with the device at positions (2) and (3). Treatment refers to the device in the on or off condition in combination with the Faraday Cage (F, n = 0 or 1). Treatments were as follows: (*d,o* off, F, n = 0); (*d,o* on, F, n=1); (*d,j* off, F, n = 0); (*d,j* on, F, n = 1).

We followed the randomized design procedures as described in Part I and collected data for each experimental treatment and position on two consecutive days.[8] We analyzed the results from four unique perspectives: the data were organized by pooling for (1) both day and position, (2) position only, (3) day only and (4) the data is displayed for each day and position combination. We presented our results in the same fashion as described in Part I.[9] That is, Figures show means and standard errors of the mean; data were log-transformed

and assessed with ANOVA and comparisons were assessed with Tukey post hoc tests. The ANOVA, Tukey tests and boxplots are given in Appendix A and Appendix B respectively. Finally, "significant" refers to Matthew's $p < 0.003$ criteria.[12]

RESULTS

In describing the details of this experiment, we focus on, ΔALP, the difference in ALP activity in (C) between (*d,j*) and (*d,o*). ΔALP can be (0), indicating no difference between the devices; (+), indicating higher values for (*d,j*) or (-), indicating higher values for (*d,o*). Firstly, we consider Perspective 1, which gives the overall view of our experiment (see Figure 2). For (F, n = 0), (*d,j*) and (*d,o*) produced similar effects in (C) for the off condition. However, when the devices were turned on, the ALP activity in (C) was increased for (*d,j*) and decreased for (*d,o*). For (F, n = 1), ALP activity in (C) was greater for (*d,o*) in comparison to (*d,j*) for the off condition and this was reversed for the on condition. These differences were confirmed as significant by ANOVA and the majority of significant Tukey tests were observed for the treatment combination (*d,j*, on, F, n = 1). Finally, significant ΔALP values were observed for (on, F, n = 0), (ΔALP = +17 IU) and (on, F, n = 1), (ΔALP = +11 IU).

In this experiment we did detect a significant and important effect for day and we assess this via Perspective 2, where we pooled the data for position and examined the influence of the first and second days of experimentation (Figure 3). The important observation here was that the second day appeared to produce greater divergence between the treatments. Interestingly, the majority of significant treatment comparisons were observed for the treatment combination (*d,j* on, F, n = 1) on day 1 and (*d,j* on, F, n = 0) on day 2.

For ΔALP, significant comparisons were as follows: day 1: (on, F, n = 1), (ΔALP = +13 IU) and day 2: (on, F, n = 0), (ΔALP = +27 IU). Further examining the influence of the first and second days of experimentation, the (F, n = 0), device on condition shows the largest change compared to Figure 2. Examining ΔALP for (on, F, n = o), it was (+17 IU) in Figure 2, but it was reduced to (+8 IU), for day 1 which was not significant, and increased to (+27 IU) for day 2 with Perspective 2 (Figure 3).

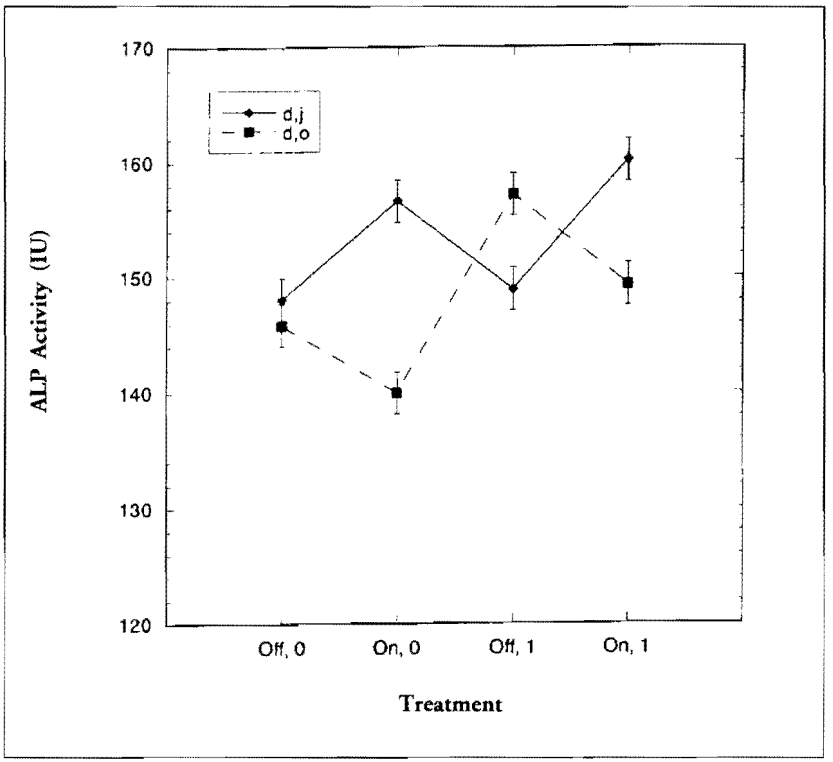

Figure 2. *Device, Position and Faraday Cage: Perspective 1, data pooled for day and position.*

We next consider perspective 3, where we pooled the data for day and examined the influence of position (Figure 4). Considering ΔALP, significant comparisons were as follows:

p1: (on, F, n = 0), (ΔALP = +23 IU); (off, F, n = 1), (ΔALP = -20 IU);
(on, F, n = 1), (ΔALP = +20 IU).
p2: (on, F, n = 1), (ΔALP = +22 IU).
p3: (on, F, n = 0), (ΔALP = +21 IU).

The reader may examine the many other comparisons and we highlight one interesting comparison here: position 1 gave similar results to Figure 2 but ΔALP activity was much larger (almost a factor of two) at treatments (on, F,

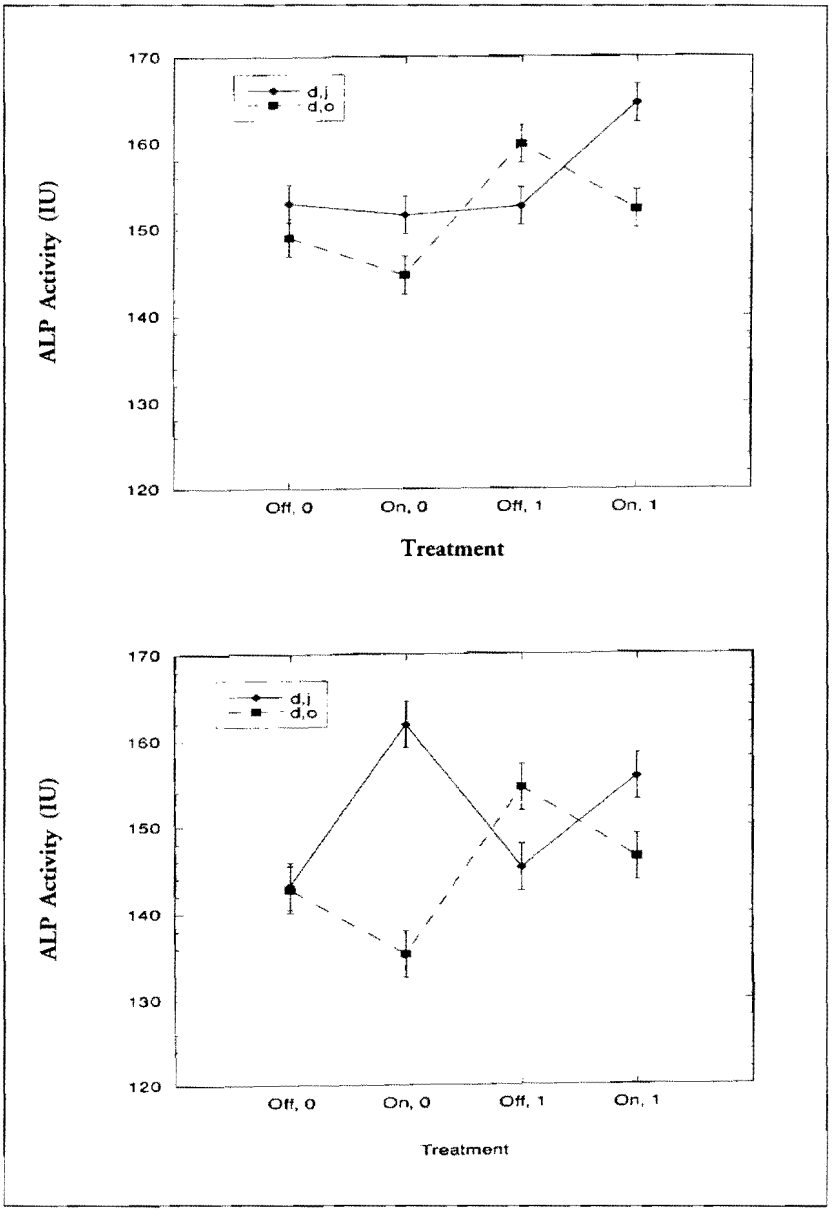

Figure 3. *Device, Position and Faraday Cage: Perspective 2, data pooled for: (a, top) Day 1, (b, bottom) Day 2*

n = o); (off, F, n = 1) and (on, F, n = 1). At the other two positions, some of the ΔALP increased and some decreased.

Finally, when we consider perspective 4 and the unpooled data, many detailed features may be examined by the reader (Figure 5). Considering ΔALP, significant comparisons were as follows:

day 2, p1: (on, F, n = 0), (ΔALP = +33 IU); (off, F, n = 1), (ΔALP = -31 IU); (on, F n = 1), (ΔALP = +32 IU)

day 1, p2: (on F, n = 1), (ΔALP = +25 IU)

day 2, p2: (on F, n = 1), (ΔALP = +20 IU)

day 2, p3: (on F, n = 0), (ΔALP = +36 IU); (on, F, n = 1), (ΔALP = -23 IU)

No significant comparisons were observed for (day 1, p1) and (day 1, p3).

Again we highlight one observation - in comparison with Figure 2, Figure 5 (d) plots the ALP activity for day 2 with the devices at position 1 and we note that all three of the ΔALP activity values have more than doubled the values found in Figure 2.

DISCUSSION

We have again observed some remarkable and statistically significant effects that appear to have no ready explanation based upon the accepted, present day, scientific paradigm. Again we noted a significant contrast between the 'setting the scene' results of Part I and the results for our experiment.[9] In particular, not only did Faraday cage shielding from ambient environmental EMFs significantly increase ALP activity while the low power/specific frequency EMFs from an unimprinted device significantly reduces ALP activity, but the specific intention imprint of the IIED more than compensated for these normal EMF effects and increased the ALP activity most of all. Thus, it has been clearly shown that the IIED effects on water and in vivo biological systems can be extended to an in vitro biological material, the liver enzyme alkaline phosphatase.[1-4,7]

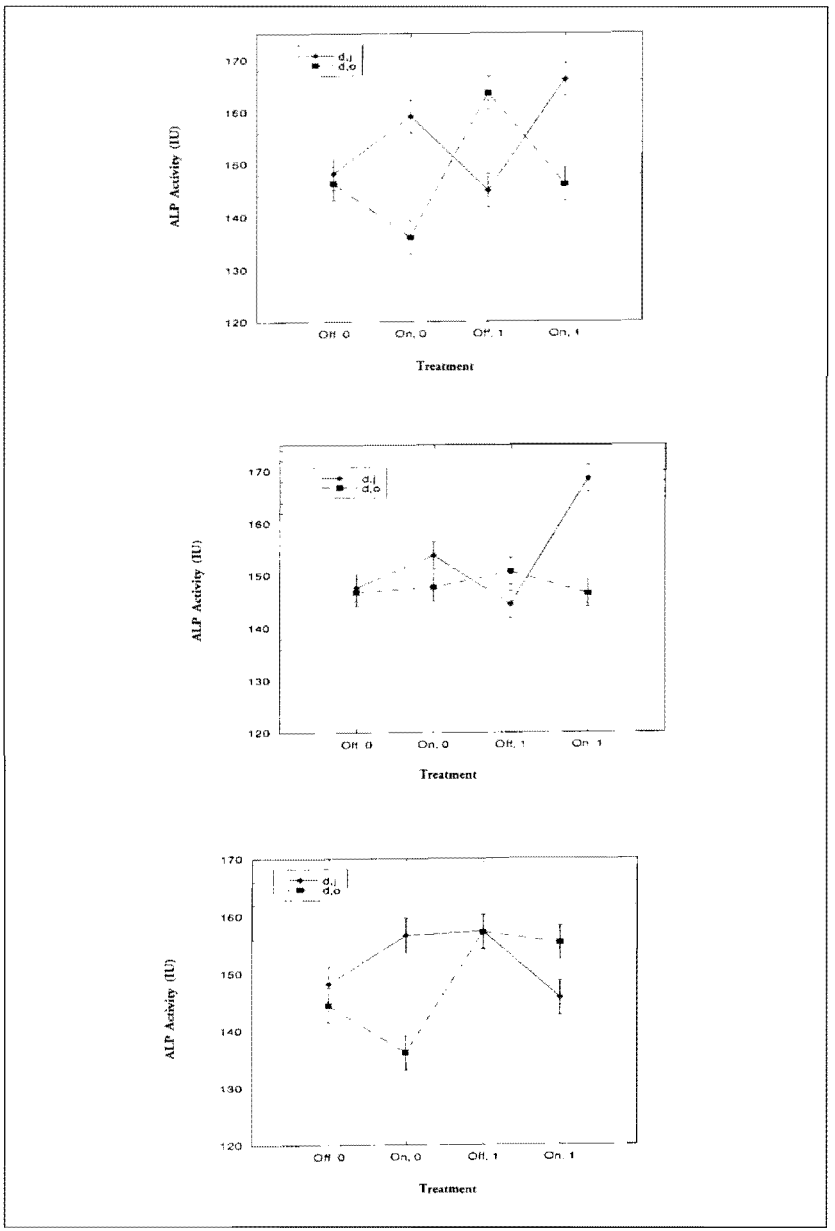

Figure 4. *Device, Position and Faraday Cage: Perspective 3, data pooled for day. (a, top) position 1, (p1), (b, middle) position 2, (p2), (c, bottom) position 3, (p3)*

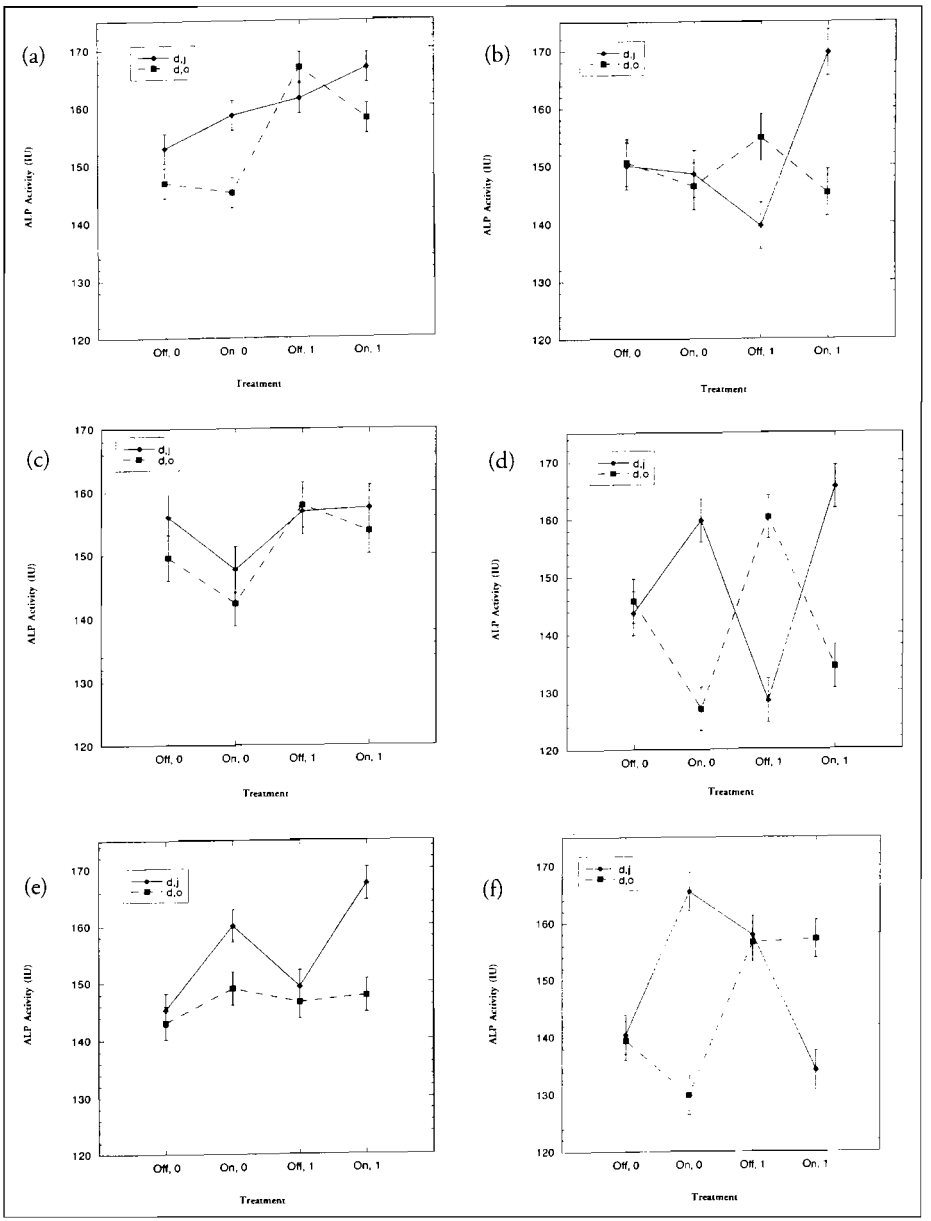

Figure 5. *Device, Position and Faraday Cage: Perspective 4, data for all day and position (**p**) combinations. (a) day 1, p1, (b) day 1, p2, (c) day 1, p3, (d) day 2, p1, (e) day 2, p2, (f) day 2, p3.*

The Effect of Day

Our results indicated that the day effect was relatively stronger for (F, n = 0) than (F, n = 1), with day 2 yielding significantly higher ΔALP values than day 1, for the on condition. We point out that ΔALP values were in the positive direction, but not significant, for (on, F, n = 0) on day 1 and that they were markedly increased for day 2. Furthermore, we note that ΔALP values were in the positive direction for (on, F, n = 1) for both days 1 and 2, but were only significant for day 1. Here, we did not observe as great an increase from day 1 to day 2 as was observed for (on, F, n = 0). Thus the day effect may indicate "conditioning" of the local environment enabling clear manifestation of the device/intention effect on the second day. This is seen for (F, n = 0). The (F, n = 1) case appeared to enable manifestation of the device /intention effect on both days and was significant on the first day, suggesting that the Faraday cage was involved in and enhanced the conditioning process. This suggests that "conditioning" may occur in (on, F, n = 0) environment on day 1, leading to a powerful manifestation of the device/intention effect on day 2.

Further, it appeared that the (on, F, n = 1) environment enabled the device/intention effect to manifest "immediately without 'conditioning.'" The degree of this effect may be much greater for subsequent days in this (on, F, n = 1) environment and we will asses this idea in future experiments. Thus, we propose that the role of the Faraday cage in our experiments may be in conditioning the local environment, together with shielding EMFs. We also note that the ultimate device/intention effect may be constrained by the Faraday cage in comparison to its absence.

The Effect of Position

The combination p3, (on, F, n = 1) breaks down the device/intention effect that was observed at the other position-treatment combinations and this effect was very clear for day 2. (see Figure 4 (c), ΔALP= -9 IU, not significant and Figure 5 (f) ΔALP= -23 IU, significant). Thus, if the role of the Faraday cage is in 'conditioning', then why was the device/intention effect reversed for p3, (on, F, n = 1)? Consider the distances between (C) and the positions – p1 was 13.5 cm from (C); p2, 34 cm and p3, 54.5 cm. Thus, p3 is the furthest from (C) by about 20 cm, and this distance effect, together with the shielding effect of the Faraday cage may have caused the diminished (d,j) effect.

Finally, it was also possible that the reversal of the device effect at p3 for (on, F, n = 1) was due to a diminished effect for (*d,j*), that is, this device at this time does not 'do its thing'. Possibly, the intention effect has leaked out of (*d,j*), or has simply ceased to function, by the time this experiment was carried out. In this regard, we note that the devices were charged with the specific intention in July, 1998 and that the experiments were conducted in March and April, 1999. Thus, we have observed the intention effect manifesting after a period of 8 months.

Considering the time aspect and the reversed device effect at position 3, effect, we note that this was the last position to be assessed and that this took place 2 weeks after data collection for position 1. Thus, despite the (on, F, n = 1) conditioning effect in the local environment, which may enable the device/intention effect to manifest immediately, there was also a position effect that operated via a diminished device effect beyond a certain distance from (C). The system may also be influenced by the shielding effect of the Faraday cage and the loss of the intention effect from the device as a consequence of time.

CONCLUSION

In conclusion, when one of our electrical devices was placed in the Faraday cage, a series of very significant differences were noted by the ALP detector activity as a result of the following comparisons: (1) fixed device (*d,j* or *d,o*), (2) fixed device position (1, 2, or 3) relative to the ALP detector, (3) fixed ALP assay period (day 1 or day 2), (4) fixed device condition (off or on) and (5) fixed number of copper layers in the Faraday cage (F, n = 1 or 0). The largest differential effects occurred when the device was in position 1 and the ALP detector assaying occurred on day 2 of the exposure to the particular treatment. Overall, this is at least a 5-variable phenomenon and, since the new physics involved is largely R-space physics, we are probably dealing here with multiple interference effects in that domain.[1,13] Finally, our results indicated that, for the intention and device effect to clearly manifest, some sort of "conditioning" is required in the local environment (day 2 versus day 1) and that this effect is influenced by the presence of the Faraday cage, position and device.

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APPENDIX A
ANOVAs and Tukey Post Hoc Tests

1. Perspective 1: Data pooled for day and position

ANOVA

source	***df***	**mean square**	***F***
device (*d*)	1	0.107	16.492**
treatment	3	0.048	7.483**
treatment x (*d*)	3	0.111	17.216**
error	327	0.006	

Tukey post hoc comparisons significant at $p < 0.05$:

Comparison and *p* value	**Comparison and *p*-value**
d,j, on, 1FC:	*d,j*, on, 0FC
> *d,j*, off, 0FC – $p = 0.000$	> *d,j*, off, 0FC – $p = 0.034$
> *d,j*, off, 1FC – $p = 0.001$	> *d,j*, off, 1FC – $p = 0.059$
> *d,o*, off, 0FC – $p = 0.000$	
> *d,o*, on, 0FC – $p = 0.000$	
> *d,o*, on, 1FC – $p = 0.002$	
d,j, on, 0FC:	*d,o*, off, 1FC:
> *d,o*, off, 0FC – $p = 0.001$	> *d,j*, off, 0FC – $p = 0.018$
> *d,o*, on, 0FC – $p = 0.000$	> *d,j*, off, 1FC – $p = 0.032$
	> *d,o*, on, 1FC – $p = 0.058$
d,o, off 1FC:	*d,o*, on, 0FC:
> *d,o*, off, 0FC – $p = 0.001$	< *d,j*, off, 0FC – $p = 0.022$
> *d,o*, on, 0FC – $p = 0.000$	< *d,j*, off, 1FC – $p = 0.012$
	< *d,o*, on, 1FC – $p = 0.006$

** indicates $p < 0.001$ and * $p < 0.05$

Treatment refers to the device in the on or off condition in combination with the Faraday Cage (F, $n = 0$ or 1).

2. Perspective 2: Data pooled for position.

ANOVA:

Day 1:

Source	***df***	**mean square**	***F***
device (*d*)	1	0.029	6.380*
treatment	3	0.039	8.583**
treatment x (*d*)	3	0.030	6.683**
error	160	0.004	

Day 2:

Source	***df***	**mean square**	***F***
device (*d*)	1	0.087	12.105**
treatment	3	0.022	3.020*
treatment x (*d*)	3	0.112	15.710**
error	159	0.007	

Tukey post hoc tests significant at $p < 0.05$:

Day 1:

Comparison	***p*-value**
d,j, on, *n* = 1	
> *d,j*, on, *n* = 0	0.002
> *d,o*, off, *n* = 0	0.000
> *d,o*, on, *n* = 0	0.000
> *d,o*, on, *n* = 1	0.003
> *d,j*, off, *n* = 1	0.005
> *d,j*, off, *n* = 0	0.009
d,o, off, *n* = 1	
> *d,o*, on, *n* = 0	0.000
> *d,o*, off, *n* = 0	0.016

Day 2:

Comparison	***p*-value**
d,j, on, *n* = 0	
> *d,j*, off, *n* = 0	0.000
> *d,j*, off, *n* = 1	0.000
> *d,o*, off, *n* = 0	0.000
> *d,o*, on, *n* = 0	0.000
> *d,o*, on, *n* = 1	0.003
d,j, on, *n* = 1	
> *d,o*, on, *n* = 0	0.000
> *d,o*, off, *n* = 0	0.031
d,o, off, *n* = 1	
> *d,o*, on, *n* = 0	0.000
> *d,o*, off, *n* = 0	0.050
d,o, on, *n* = 1	
> *d,o*, on, *n* = 0	0.050

3. Perspective 3: Data pooled for day.

Position 1:

ANOVA:

Source	***df***	**mean square**	***F***
device (d)	1	0.057	8.625*
treatment	3	0.023	3.448*
treatment x d	3	0.119	18.086**
error	104	0.007	

Tukey post hoc tests significant at p < 0.05:

Comparison	***p*-value**
d,j, on, *n* = 1:	
> *d,j*, off, *n* = 1	0.000
> *d,o*, off, *n* = 0	0.002
> *d,o*, on, *n* = 0	0.000
> *d,o*, on, *n* = 1	0.001
> *d,j*, off, *n* = 0	0.008
d,j, on, *n* = 0:	
> *d,o*, on, *n* = 0	0.000
> *d,j*, off, *n* = 1	0.031
d,o, off, *n* = 1:	
> *d,j*, off, *n* = 1	0.002
> *d,o*, on, *n* = 0	0.000
> *d,o*, on, *n* = 1	0.006
d,o, off, *n* = 1:	
> *d,j*, off, *n* = 0	0.043
> *d,o*, off, *n* = 0	0.011

Position 2:

ANOVA:

Source	***df***	**mean square**	***F***
device (d)	3	0.037	8.701**
treatment	1	0.026	6.204**
treatment x d	3	0.042	10.078**
error	103	0.004	

Tukey post hoc comparisons significant at $p < 0.05$:

Comparison	***p*-value**
d,j, on, $n = 1$:	
> *d,j*, off, $n = 0$	0.000
> *d,j*, off, $n = 1$	0.000
> *d,o*, off, $n = 0$	0.000
> *d,o*, on, $n = 0$	0.000
> *d,o*, off, $n = 1$	0.000
> *d,o*, on, $n = 1$	0.000
> *d,j*, on, $n = 0$	0.008

Position 3:

ANOVA:

Source	***df***	**mean square**	***F***
device (d)	1	0.018	3.204
treatment	3	0.035	6.260**
treatment x d	3	0.051	9.101**
error	104	0.006	

Tukey post hoc comparisons significant at $p < 0.05$:

Comparison	***p*-value**
d,o, on, $n = 0$:	
< *d,j*, on, $n = 0$	0.000
< *d,j*, off, $n = 1$	0.000
< *d,o*, off, $n = 1$	0.000
< *d,o*, on, $n = 1$	0.000
d,j, off, $n = 1$:	
> *d,o*, off, $n = 0$	0.048
d,o, off, $n = 1$:	
> *d,o*, off, $n = 0$	0.057

4. Perspective 4: Data for all day and position combinations.

ANOVA:

Source	***df***	**mean square**	***F***
device (d)	1	0.107	29.250**
day	1	0.118	32.244**
treatment (t)	3	0.048	13.137**
position (p)	2	0.001	0.351
d x day	1	0.008	2.127
d x t	3	0.112	30.507**
d x p	2	0.003	0.759
day x t	3	0.012	3.221*
day x p	2	0.050	13.547**
t x p	6	0.018	4.821**
d x day x t	3	0.031	8.476**
d x day x p	2	0.003	0.853
d x t x p	6	0.050	13.571**
day x t x p	6	0.013	3.621*
d x day x t x p	6	0.034	9.320**
error	287	0.004	

ANOVAs:

Day 1, position 1:

Source	***df***	**mean square**	***F***
device (d)	1	0.020	10.158*
treatment	3	0.030	15.093**
treatment x (d)	3	0.009	4.576*
error	48	0.002	

Day 2, position 1:

Source	***df***	**mean square**	***F***
device (d)	1	0.038	8.086*
treatment	3	0.006	1.209
treatment x (d)	3	0.158	33.501**
error	48	0.005	

Day 1, position 2:

Source	***df***	**mean square**	***F***
device (d)	1	0.003	0.666
treatment	3	0.013	2.471
treatment x (d)	3	0.040	7.746**
error	48	0.005	

Day 2, position 2:

Source	***df***	**mean square**	***F***
device (d)	1	0.047	17.962**
treatment	3	0.022	8.355**
treatment x (d)	3	0.009	3.630*
error	47	0.003	

Day 1, position 3:

Source	***df***	**mean square**	***F***
device (d)	1	0.009	2.211
treatment	3	0.018	4.636*
treatment x (d)	3	0.002	0.390
error	48	0.004	

Day 2, position 3:

Source	***df***	**mean square**	***F***
device (d)	1	0.009	2.600
treatment	3	0.034	9.442**
treatment x (d)	3	0.094	26.195**
error	48	0.004	

Tukey post hoc tests significant at $p < 0.05$:

Day 1, Position 1:

Comparison	***p*-value**
d,o, off, 1FC	
> *d,o,* off, 0FC	0.000
> *d,o,* on, 0FC	0.000
> *d,j,* off, 0FC	0.013
d,j, off, 1FC	
> *d,o,* on, 0FC	0.001
> *d,o,* off, 0FC	0.005
d,j, on 0FC	
> *d,o,* on, 0FC	0.011
> *d,o,* off, 0FC	0.041
d,j, on 1FC	
> *d,o,* off, 0FC	0.000
> *d,o,* on, 0FC	0.000

Day 2, Position 1:

Comparison	***p*-value**
d,j, on, 0FC	
> *d,j,* off, 1FC	0.000
> *d,o,* on, 0FC	0.000
> *d,o,* on, 1FC	0.001
d,j, on, 1FC	
> *d,j,* off, 1FC	0.000
> *d,o,* on, 0FC	0.000
> *d,o,* on, 1FC	0.000
> *d,j,* off, 0FC	0.008
> *d,o,* off, 0FC	0.022
d,j, off, 0FC	
> *d,o,* on, 0FC	0.026
d,o, off, 0FC	
> *d,o,* on, 0FC	0.010
> *d,j,* off, 1FC	0.024
d,o, off, 1FC	
> *d,j,* off, 1FC	0.000
> *d,o,* on, 0FC	0.000
> *d,o,* on, 1FC	0.000

Day 1, Position 2:

Comparison	***p*-value**
d,j, on, 1FC	
> *d,j,* off, 1FC	0.000
> *d,o,* on, 1FC	0.004
> *d,o,* on, 0FC	0.008
> *d,j,* on, 0FC	0.023
> *d,o,* off, 0FC	0.050

Day 2, Position 2:

Comparison	***p*-value**
d,j, on, 0FC	
> *d,o,* off, 0FC	0.006
> *d,j,* off, 0FC	0.027
d,j, on 1FC	
> *d,j,* off, 0FC	0.000
> *d,o,* off, 0FC	0.000
> *d,o,* off, 1FC	0.000
> *d,o,* on, 1FC	0.001
> *d,o,* on, 0FC	0.002
> *d,j,* off, 1FC	0.003

Day 1, Position 3:

No Tukey post hoc tests were significant at $p < 0.05$.

Day 2, Position 3:

Comparison	***p*-value**
d,j, on, 0FC	
> *d,j,* off, 0FC	0.000
> *d,j,* on, 1FC	0.000
> *d,o,* off, 0FC	0.000
> *d,o,* on, 0FC	0.000
d,j, off 1FC	
> *d,j,* on, 1FC	0.000
> *d,o,* on, 0FC	0.000
> *d,o,* off, 0FC	0.005
d,o, off, 1FC	
> *d,j,* on, 1FC	0.000
> *d,o,* on, 0FC	0.000
> *d,o,* off, 0FC	0.012
> *d,j,* off, 0FC	0.029
d,o, on, 1FC	
> *d,j,* on, 1FC	0.000
> *d,o,* on, 0FC	0.000
> *d,o,* off, 0FC	0.010
> *d,j,* off, 0FC	0.024

Appendix B
Notched Boxplot Representation of All Our Data

1. Perspective 1: Data poled for day and position.

2. Perspective 2: Data pooled for position.
   (a) day 1
   (b) day 2.

3. Perspective 3: Data pooled for day.
   (a): position 1
   (b) position 2
   (c) position 3.

4. Perspective 4: Data for all day and position (p) combinations.
   (a) day 1, p1
   (b) day 1, p2
   (c) day 1, p3
   (d) day 2, p1
   (e) day 2, p2
   (f) day 2, p3

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