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COMMENTARY

A Reply to van den Berg and van der Sluys: Effects Resembling a Bio-Field on a Torsion Pendulum Cannot Be Caused by Heated Air Currents Generated by the Subject

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This paper is a reply to the paper "Is the Human Bioenergy Field Detected by a Torsion Pendulum? The Effect of Shielding and a Possible Conventional Explanation" by W. H. van den Berg and W. G. van der Sluys, *Journal of Scientific Exploration*, *29*(1), this issue. The latter paper was inspired by "Use of a Torsion Pendulum Balance to Detect and Characterize What May Be a Human Bioenergy Field" by J. N. Hansen and J. A. Lieberman, *Journal of Scientific Exploration*, *27*(2), 205–225, 2013. Throughout this current paper, we will use abbreviations to refer to our paper and the van den Berg paper. Accordingly, the van den Berg/van der Sluys paper will be abbreviated as vdB, and the Hansen/Lieberman paper will be abbreviated H&L. To facilitate access to the H&L paper, it is available at:
http://hdl.handle.net/1903/15607

We believe the most important result in the vdB paper is that it confirms the results presented in our H&L paper. vdB constructed a torsion pendulum balance identical to ours, and performed experiments similar to ours. Their results are consistent with ours in every detail. They acknowledged the simplicity of the pendulum in both its construction and use, and that it produced consistent results, in experiment after experiment; and the results of all those experiments were consistent with our results. Replication of an experiment in other laboratories and obtaining the same results is a crucial stage of the scientific process. Other investigators have communicated to us that they have replicated our results, but this is the first instance we know of in which confirmation of experiments using our pendulum has been published.

vdB also reports the result of an experiment we did not do. They placed a thick plastic shield between the subject and the pendulum, and found that the effects of the subject on the pendulum were eliminated. Since we did not do an experiment of this kind, their result is not a contradiction, but an extension toward something new. They performed this shielding experiment with the intent to completely rule out the possibility of air convention currents created by heat evolved from the head of the subject as the cause of the effects on the pendulum. They provided two possibilities to explain the loss of the effect caused by the shielding. One is that heat-generated air currents are responsible for the effect, and when the shield blocks the air currents the effect on the pendulum is lost. Alternately, it is possible that the thick plastic blocks the putative bio-field from reaching the pendulum. They chose the first explanation, and argued that the shielding effect was probably caused by the elimination of air convection currents generated by the subject. We choose the second explanation, which is that the thick plastic blocked the bio-field from reaching the pendulum. We here provide evidence and arguments for this position that we believe are strong. Whereas we present new experimental data to support this, the H&L paper is already replete with similar evidence and arguments that the putative bio-field cannot be the result of heat-induced air currents. We present nothing that is not already embodied in the H&L paper, but merely present in a way to more effectively communicate the idea that the effect on the pendulum is not due to heat-induced air currents by the subject while under the pendulum.

We now address several aspects from the vdB paper with which we do not agree. The Introduction in vdB states that “One may define the bio-energy field as that which mediates effects such as distant healing or psychokinesis.” They also refer to the bio-field throughout as THE human bio-field; implying that only one human bio-field is possible. In contrast, H&L refer to the detected phenomenon as “what may be **A** human bioenergy field,” (taken from the title of the paper, with emphasis on **A**, not **THE**). Nowhere in H&L do we claim that what we observed is related to psychokinesis, energy healing, or any other psychic phenomenon. Our claim is much more modest; merely being the detection and measurement of effects exerted on a torsional pendulum by a subject seated under it. Since the effects were so unusual, we advanced the speculation that it could be the consequence of a human bio-energy field. If a human bio-field exists, there could be several kinds of them, just as there are several conventional means of communication such as voice, facial and body gestures, etc. The novel approach of H&L was to build a detector using the premise that there could be a bio-field that exerted a physical ‘pushing-type’ force, instead of the more common photon detectors. The pendulum accordingly could respond

to these pushing forces, in which the putative bio-field would push against the pendulum to induce oscillations. We accordingly discovered strong effects by a subject on the pendulum, which were detected and measured by a physical device that can be easily replicated.

If you were to place a thick plastic shield between the subject and the pendulum, the pushing force would initially be against the shield, and the pendulum would only respond to whatever pushing force remained after pushing against the shield. For the pushing force to survive passage through the shield and then push against the pendulum would violate fundamental principles of physics; i.e. you can only use a force once, and if it is utilized to push against the shield it cannot subsequently push against the pendulum. The vdB paper instead states:

> . . . that, in general, effects like psychokinesis, distant healing, and extrasensory perception are reportedly not affected by spatial or temporal separation, nor by intervening matter. Furthermore, such "paranormal" abilities are anything but uniformly distributed among the population, but the ability to perturb a torsion pendulum appears universal.

This is a breathtaking statement that implies not only wide acceptance that these psychic phenomena exist, but that their fundamental properties are well-known and understood. Whereas beliefs in these phenomena and their qualities are popular, none are accepted by mainstream science; therefore this argument is highly inappropriate, especially in that it suggests that the pendulum effect is not 'spooky' enough to qualify as a genuine bio-field. Also dubious is the argument that the pendulum effects cannot be due to a bio-field because all subjects exert these effects. Whereas vdB states that the ability to invoke psychic phenomena is believed to be limited to those who are innately gifted and highly trained and practiced, we take a contrary view that any genuine human bio-field could only exist if it provided an important biological role and therefore be subject to natural selection, just as our five senses have been. The five senses are accordingly available to all, and not limited to the innately talented and trained. However, there are traits common to all, such as musical ability, that can be enhanced by talent and training; as exemplified by virtuoso musicians who perform feats far beyond the ordinary. We accordingly recognize that the pendulum is a potential bio-feedback device, by which the subject, while watching the motions of the pendulum on a computer display, could be able learn to manipulate the bio-field in a way to consciously control the motions of the pendulum. This would require extensive experimentation, but if it were achieved should be qualified as "psychokinesis." Some subjects may be able to achieve this more easily than others, just as some learn to play an

instrument more easily than others. Since this has not been achieved, it is inappropriate to use the term psychokinesis here.

Whereas several arguments can be presented to establish that the pendulum effects cannot be the result of heat-generated convection air currents from the subject, we will focus on the most important one. It is that H&L demonstrated that the subject effects on the pendulum persist long after (30–60 min) the subject has departed from the pendulum. This phenomenon was clearly shown in Figures 8, 9, and 10 of H&L, and the significance was thoroughly discussed, and appeared prominently in the Abstract of the paper. Persistence is especially evident in Figure 10, in which the pendulum and subject were grounded. The post-subject data region extends for 45 min, and effects are still strong at the end of the 45-min time period. (A copy of the H&L paper is available at the UM Digital Repository: http://hdl.handle.net/1903/15607).

A fundamental principle of pendulum physics is that if the pendulum is driven by an outside force and the force is removed, then the pendulum will **immediately** return to classic non-driven motion. We performed control experiments that used streams of compressed air to drive the pendulum, whereupon the pendulum immediately returned to classical motion when the stream of air was discontinued, as dictated by classical physics; shown here in Figure 1. In contrast to the effect exerted by a compressed air, the persistence of subject effects after the subject has departed is a consistent feature in virtually every experiment we have performed. Moreover, it is clearly manifested in Figure 4 of the vdB paper, in which the oscillation pattern of Region C, which is after the subject departed, is very different from Region A, which shows the oscillation of the pendulum prior to the subject being seated under the pendulum and therefore reflects its classic pendulum motion. It would have been good if more data from Region C had been collected before the experiment was terminated, which would have better demonstrated the persistence of the subject effects; but persistence is clearly shown in their own experiment, nevertheless. They ignored the significance of it.

Instead of replicating the H&L Figures 8, 9, 10 here, we will present the results of some newer experiments that show similar results. Among many dozens of experiments, preference was given to those in which data was collected for an extended period of time after departure of the subject. For this, we chose an experiment that extended over several hours, during which the subject was first seated under the pendulum and departed after 30 min; and re-seated after an hour, followed by data collection for 30 min; the subject then departed again, and data collection continued during the subsequent post-subject region. This is therefore a duplicate experiment

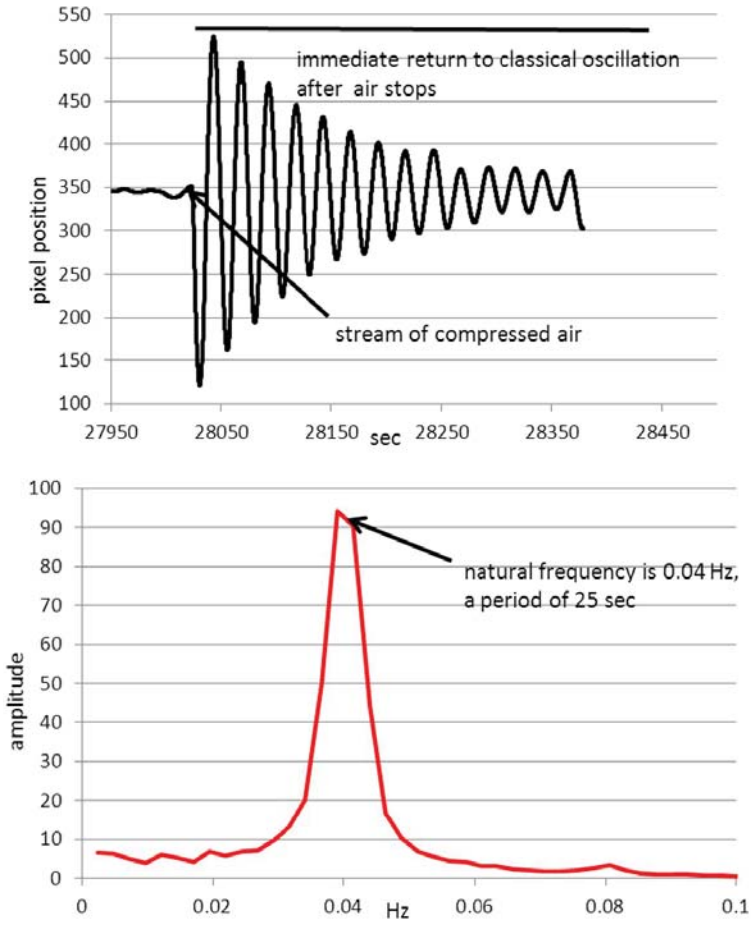

Figure 1. This figure shows the immediate recovery to classical oscillation after the pendulum has been subjected to a brief stream of compressed air. (Upper Panel) Shows the profile before and after the puff of air. (Lower Panel) Shows the FFT analysis of the entire recovery region of the data. It shows a single frequency peak of 0.04 Hz, which is the natural fre-quency of the pendulum. If the recovery had not been immediate, more than the natural frequency should have appeared. This recovery experiment was performed multiple times, and the result was always the same. This suggests that the persistence of effects after the subject has departed means that, despite the absence of the subject, the energetic effects imparted by the subject are still able to drive the pendulum to non-classical behavior.

using the same subject for two successive experiments on the same day, during which time data was collected continuously. The results are shown below as ‘Run 1’ and ‘Run 2’.

The Oscillations of the Pendulum Deviate from the Natural Center of Oscillation When the Subject Is Present, and This Deviation Continues After the Subject Departs

Run 1 is shown in Figure 2, in which the upper panel displays the data for the entire run, and the lower panel displays the data from just the post-subject region, after the subject has departed from the pendulum. Both the subject-

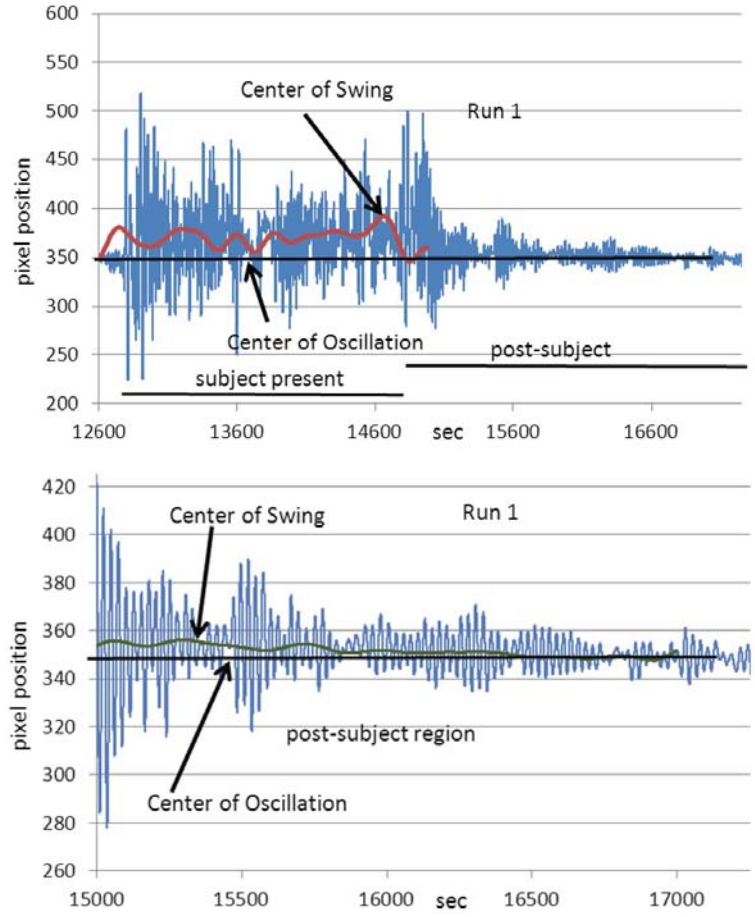

Figure 2. Data from Run 1.
(Upper Panel) Displays the data for the entire run, which includes the time the subject is present and the post-subject region.
(Lower Panel) Displays the data just for the post-subject region. The natural Center of Oscillation is indicated by a horizontal line, and the curved line connects the midpoints of the individual swings of the pendulum. The mid-points are substantially displaced from the COO throughout the run, indicating a spiral vortex of some kind. These effects persist throughout the post-subject region.

present region and the post-subject region show displacements from the natural Center of Oscillation (COO) of the pendulum as shown by a curve that goes through the midpoints of the individual swings. If the COO had not shifted, the curve going through the midpoints would coincide with the COO; instead it is significantly above the COO, which was also observed in vdB. H&L argued that this displacement would require a force in the form

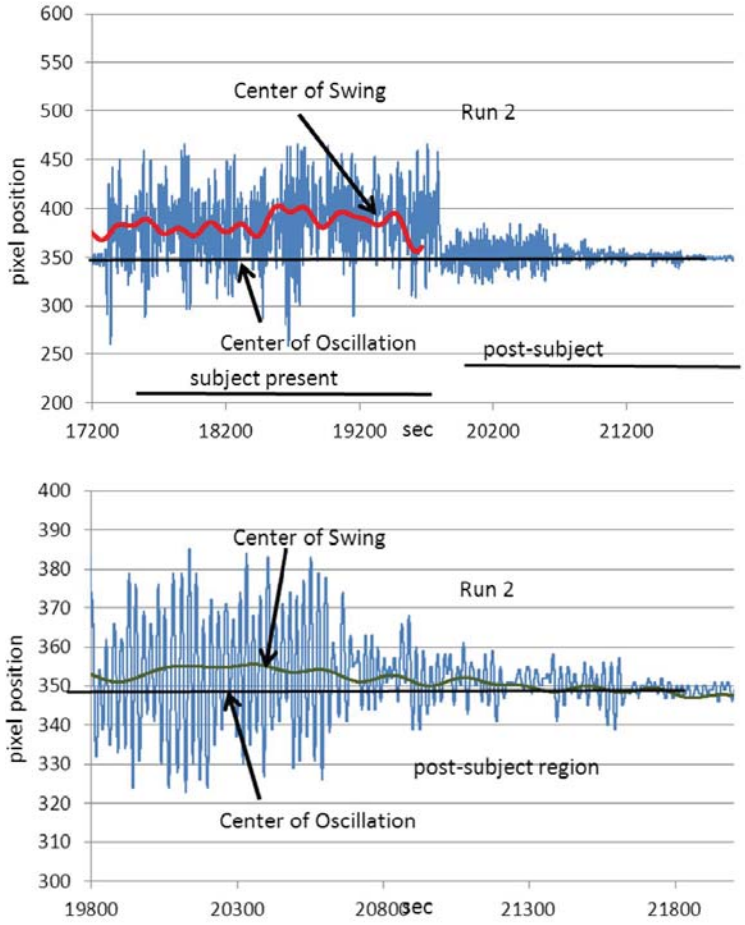

Figure 3. Data from Run 2.

(Upper Panel) Displays the data for the entire run, which includes the time the subject is present, and the post-subject region.
(Lower Panel) Displays the data just for the post-subject region. The natural Center of Oscillation is indicated by a horizontal line, and the curved line connects the midpoints of the individual swings of the pendulum. The mid-points are substantially displaced from the COO throughout the run, indicating a spiral vortex of some kind. These effects persist throughout the post-subject region.

of a spiral vortex, and this spiral vortex drags the pendulum away from its natural COO.

Run 2, which was performed an hour later on the same subject, is shown in Figure 3. The upper and lower panels display the entire run and the post-subject region, respectively. Although there are differences in the details of what occurs during Run 1 and Run 2, the general patterns are the same. We see this consistently, in that every experiment is unique in its details; but all the experiments display the same central elements, such as displacements from the COO and persistence of effects after subject departure. It is especially to be noted that the variations in amplitudes and deviation from the natural COO persist throughout the post-subject region in both experiments. This means that both the spiral vortex and the energy required to drive the amplitude changes throughout the post-subject region must still be present despite the absence of the subject. Since these effects persist throughout the 40-min post-subject time period, it is untenable that they could be the result of heat-induced air convection currents generated by the presence of the subject. The pendulum is constructed of steel mesh, so any accumulation of heated convection currents would be rapidly dissipated through the top of the pendulum. Moreover, instead of simply damping down as expected, the amplitudes alternately increase and decrease, creating a kind of 'bubble' effect in the amplitude pattern; an effect we see in every post-subject region we have examined. In the post-subject region of Run 2, the displacement from the natural COO actually increases for about 10 min, whereupon it gradually relaxes back toward the natural COO. Once again, the argument that these effects could be exerted by a long-departed subject is untenable.

Subject-Induced Frequencies Also Persist Long After the Subject Departs from the Pendulum

Although not addressed in the vdB paper, a very important component of our data analysis in H&L is Fast Fourier Transform (FFT) analysis of the oscillation pattern of the pendulum, which reveals all of the frequency components that are present in the oscillations of the pendulum. Whereas the pendulum in the absence of a subject oscillates with a single frequency as expected (Figure 1), when a subject is present, the pendulum oscillates with many new frequencies, displayed in Figure 4 for Run 1, and Figure 5 for Run 2. Moreover, Figures 4 and 5 show that these new frequencies persist into the post-subject region, albeit with reduced intensity, just as the deviations in the COO persisted. The appearance of these new frequencies in all stages of the experiments is rather astonishing, and it implies that the putative bio-field is not just a spiral vortex, but one that contains many frequency components. The detected frequencies are quite low, extending

below 0.001 Hz, and up to about 0.1 Hz. This can be compared to brain wave frequencies which are in the 4–30 Hz range, a thousand times higher. It is to be noted that the pendulum is an oscillator which is most sensitive to frequencies that are close to its fundamental frequency, so the fact that the pendulum with a fundamental frequency of 0.04 Hz does not detect frequencies above 0.1 Hz does not prove that they are not there, but instead could be undetectable with this particular pendulum with its particular fundamental frequency.

It seems improbable but possible that heat-induced convection currents from the subject could contain spiral vortexes and a rich mix of frequencies. However, it seems impossible that these heat-induced convection currents could continue to exert spiral vortex and frequency effects long after the subject has departed. Whereas vdB argued that strong air currents can be generated as a consequence of local differences in temperature around the head of a subject, this argument should not be applicable once the subject is no longer present.

It is as if during the time the subject is under the pendulum, the bio-field exerts its effects on the motions of the pendulum, and that these effects are somehow 'imprinted' on to the pendulum, so that after the subject departs the imprinted pendulum continues to oscillate with the same characteristics as when the subject was present, although less strongly. It is difficult to avoid the idea that the bio-field has caused the atomic/molecular structure of the pendulum to shift to a higher-energy quantum state, and this state would have to possess both spiral vortex and frequency aspects that could continue to exert their effects entirely on their own, after the subject has departed. We know of no quantum states that would possess these characteristics, but our results argue that there must be quantum states that possess these characteristics. It is to be noted that these persistent effects are observed in pendulums constructed of coco fiber and plastic, and not restricted to steel mesh pendulums. Whatever these elevated quantum states may be, they can be induced in a wide variety of materials. Hubris would suggest that we claim something entirely new that is unknown to physics. We prefer to believe that, although we do not know of quantum states that can explain our results, others with greater knowledge of physics may be able to account for it.

In conclusion, our results, especially the post-subject effects on the pendulum, provide a robust argument that the subject effects on the pendulum cannot be due to heat-induced air convection currents generated by the presence of the subject. Put simply, if they were heat-induced effects, they should vanish as soon as the subject departs. They do not, but persist

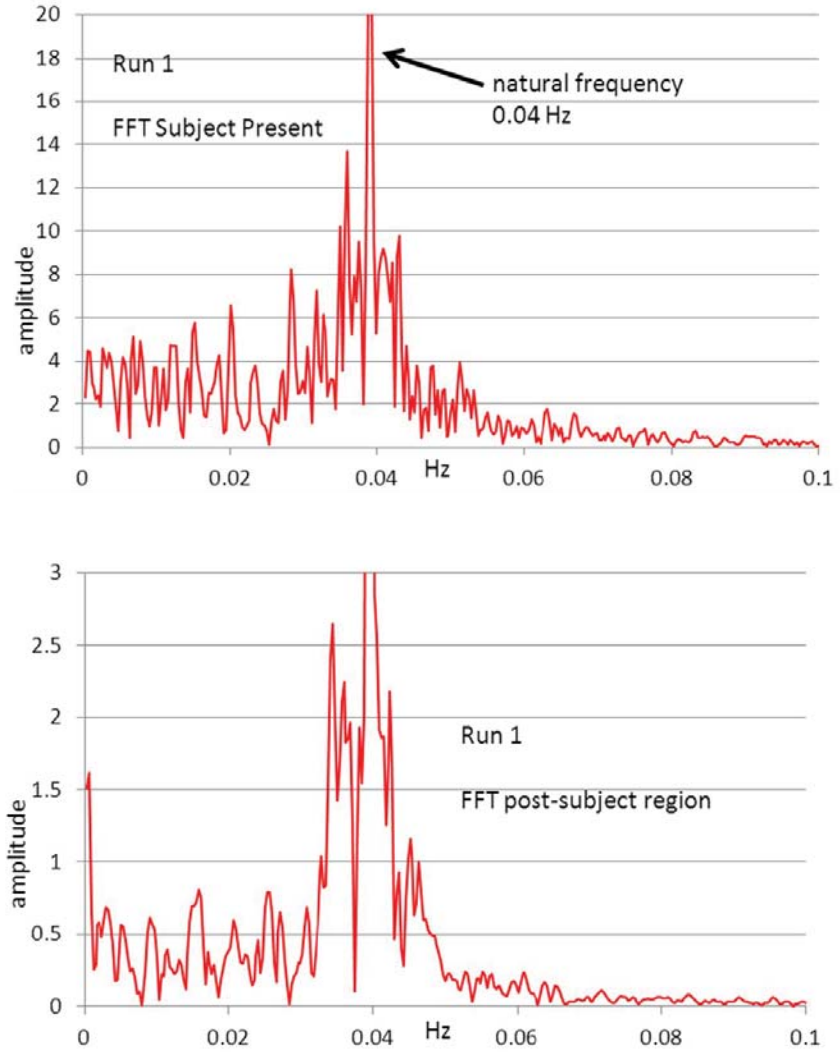

Figure 4. FFT analysis of the data from Figure 1.
(Upper Panel) Displays the frequency components of the region when the subject is present.
(Lower Panel) Displays the frequency components of the post-subject region. Although the amplitudes of the frequencies are diminished in the post-subject region, the complexity of frequencies seen in the subject region is retained in the post-subject region.

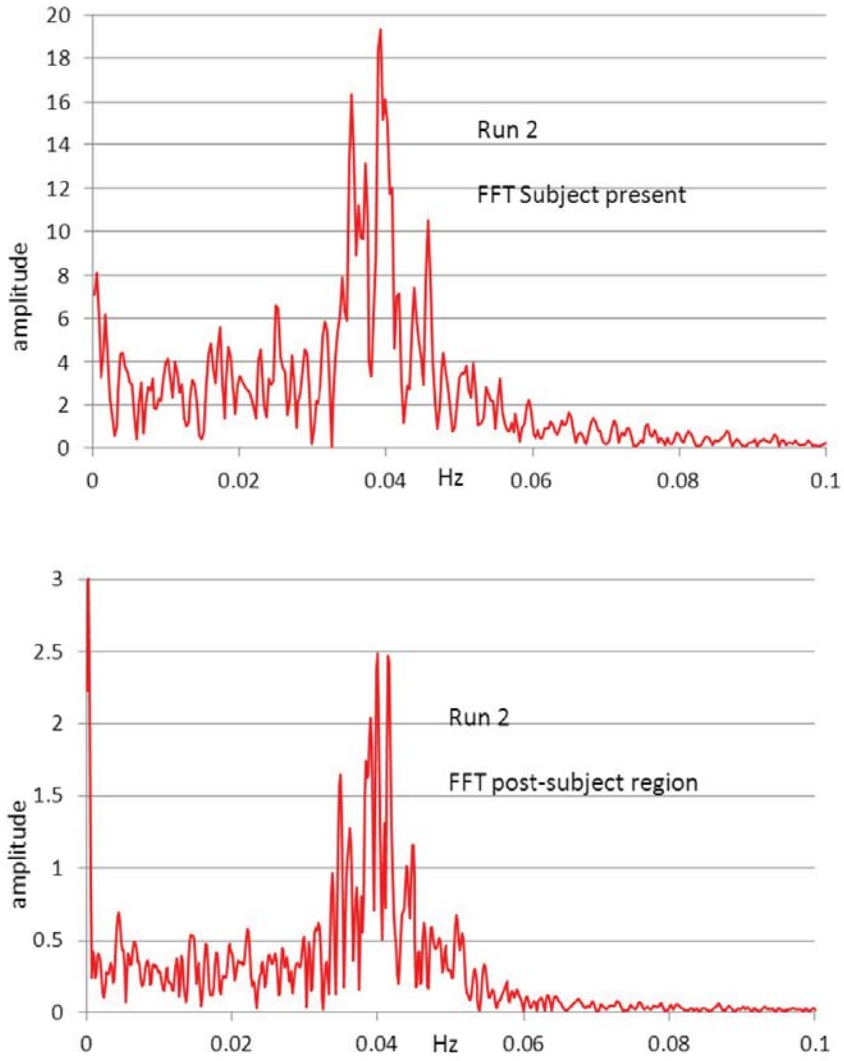

Figure 5. FFT analysis of the data from Figure 2.
(Upper Panel) Displays the frequency components of the region when the subject is present.
(Lower Panel) Displays the frequency components of the post-subject region. Although the amplitudes of the frequencies are diminished in the post-subject region, the complexity of frequencies seen in the subject region is retained in the post-subject region. The natural frequency of the pendulum is 0.04 Hz.

for 30–60 min after the subject departs. Other arguments to bolster this are presented above, but the persistence of the effects after departure of the subjects should be enough to rule out heat effects on its own. We believe that the argument by vdB that the pendulum effects are due to heat-induced air currents is refuted by what we have presented.

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Hansen, J. N., & Lieberman, J. A. (2009). Construction and Characterization of a Torsional Pendulum that Detects a Novel Form of Cranial Energy. http://hdl.handle.net/1903/9421 [additional results, controls, and interpretations]

A Parts List to build a pendulum and collect data is available at: http://hdl.handle.net/1903/15647