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Temporal Lobe Lability and Self-Reported Haunting Type Experiences: A Questionnaire Study with an Undergraduate Sample[1]

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ABSTRACT: This study examined the hypothesis that self-reported haunting type experiences are positively associated with the temporal lobe lability of the experient. Sixty-two participants completed a brief personal history questionnaire about brain trauma and drug usage, the Temporal Lobe Dysfunction Scale, and the Haunting Type Experiences Index. As expected, temporal lobe scores were positively correlated with haunting type experience scores, $r(62) = .45$, $p < .001$. High temporal lobe scorers also scored significantly higher on the Haunting Type Experiences Index than low temporal lobe scorers, $t(60) = 4.27$, $p < .001$. Brain trauma and drug usage showed no significant relationship to temporal lobe scores or haunting type experience scores. Exploratory analyses found that sub-samples, defined by gender and program of study (Fine Arts or Psychology), scored comparably on the Temporal Lobe Dysfunction Scale and the Haunting Type Experiences Index. The present results conceptually replicate previous research linking temporal lobe symptomatology and haunting type experiences, but

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further research is warranted given the methodological confounds in the present study.

INTRODUCTION

Temporal lobe lability is characterised by impairment, sensitivity, or instability in the temporal lobe regions of the brain and extends along a continuum from normals, who may exhibit no temporal lobe symptoms and those who exhibit some, to epileptics, who will exhibit pronounced impairment in these regions. Several researchers have reported an apparent link between temporal lobe lability and subjective paranormal experiences (Neppe, 1983; Palmer & Neppe, 2003; Persinger, 1984; Persinger & Valliant, 1985). For example, Neppe (1983) found that normal persons reporting a large number of subjective paranormal experiences also reported greater numbers of temporal lobe symptoms than those reporting no paranormal experiences.

Other populations evidence similar effects. In particular, positive correlations have been found between reported numbers of paranormal experiences and endorsement of temporal lobe symptoms in undergraduate samples (Persinger, 1984; Persinger & Valliant, 1985), and recently, a clinical study by Palmer and Neppe (2003) demonstrated that patients who exhibited high numbers of temporal lobe symptoms also reported more paranormal experiences than patients who exhibited few or no temporal lobe symptoms. Interestingly, females exhibited a greater number of temporal lobe symptoms in the latter study. One interpretation of this body of results is that temporal lobe lability facilitates both epileptic-like and hallucinatory experiences, the latter of which are subjectively interpreted by experients to be paranormal in origin. Alternatively, temporal lobe lability may act as a neurophysiological state which is conducive to the occurrence of veridical paranormal (psi) experiences, and/or the temporal lobes may be the neuroanatomical locus for such experiences.

Specific types of paranormal experiences called *subjective haunting type experiences* are traditionally attributed to alleged paranormal factors such as discarnate agency. These experiences include, but are not limited to, apparitional sightings, and the sense of a presence. The term ‘haunting’ prevalently denotes the *recurrence* of phenomena; however, haunting type phenomena may also occur in *isolated* fashions. Accordingly, subjective haunting type experiences considered here encompass both recurrent and isolated phenomena.

Subjective haunting type experiences have been experimentally related to temporal lobe functioning. For instance, Cook and Persinger

(1997, 2001) induced reports of a sensed presence by stimulating the temporal-parietal region of the right hemispheres of participants with weak, complex magnetic fields. Likewise, Persinger, Tiller, and Koren (2000) elicited multiple haunting type perceptions (including an apparitional sighting) in a participant who exhibited temporal lobe symptoms and had a previous history of recurrent spontaneous haunting experiences. This was achieved by stimulating the temporal lobe region of the participant's right hemisphere. For a review, see Persinger and Koren (2001b).

Persinger and Koren (2001b) have advanced an environmental magnetic model of haunting phenomena, which postulates that electromagnetic (EM) and geomagnetic (GM) fields may interact with neuroelectromagnetic patterns generated within the brain, inducing microseizuring in the temporal lobes and broader limbic region. Persinger et al. (2000) noted that "given sufficient optimal stimulation anyone along the continuum of temporal lobe sensitivity will respond to these fields" (p. 670). This model predicts that anyone is capable of having subjective haunting type experiences if exposed to sufficient variances in EM and GM fields, but individuals with temporal lobe lability or dysfunction would exhibit an increased sensitivity to such fields, due to electrical lability, and thus would tend to have more haunting type experiences. Such is exemplified in the aforementioned study (Cook & Persinger, 2001) in which participants with above average numbers of temporal lobe symptoms appeared to exhibit greater sensitivity to a weak, complex magnetic field.

Investigations of alleged hauntings have yielded evidence that is consistent with Persinger's model. Variant transient and local ambient EM and GM fields have been detected in multiple alleged hauntings and locations where anomalous phenomena have been reported (Nichols, 2000; Nichols & Roll, 1999; Persinger & Koren, 2001a; Persinger, Koren, & O'Connor, 2001; Radin & Roll, 1994; Roll, Maher, & Brown, 1992, as cited in Maher, 1999; Roll & Nichols, 2000; Roll, Sheehan, Persinger & Glass, as cited in Roll & Nichols, 2000; Suess & Persinger, 2001. For a review, see Roll & Persinger, 2001).

However, the methodologies used in such studies have varied in their designs and most studies have not employed blind protocols or adequate controls. Moreover, statistical analyses have also greatly differed and many have not used quantitative methods. Furthermore, at least two investigations employing a suitable experimental technique found no relationship between reportedly haunted sites and EM magnitude and/or variance (Maher, 2000; Maher & Hansen, 1997, as cited in Maher, 2000). Still yet, the latter two studies only measured local ambient EM fields (not transient EM fields, nor GM fields). Accordingly, it may be best to regard the relationship between alleged hauntings and EM and/or GM flux as

tentative until a strict methodology is consistently employed and subsequently confirmed in a quantitative fashion.

Further bolstering the role of temporal lobe sensitivity in haunting type experiences is the finding that epileptics are sensitive to variance in geomagnetic activity (Persinger, 1996, as cited in Persinger & Koren, 2001b). In a few cases, experients of alleged hauntings and focal persons of poltergeists have exhibited temporal lobe symptoms (Nichols, 2000; Persinger & Roll, 1993, as cited in Roll & Persinger, 2001; Terhune & Luke, 2001). A primary concern of the present study was to assess if the relationship between temporal lobe symptoms and subjective haunting type experiences was not merely an artifact of these isolated cases.

As a result of the aforementioned findings, the supposition that there is a relationship between temporal lobe lability and haunting type experiences was empirically tested via two primary hypotheses: 1) A positive correlation exists between scores on the Temporal Lobe Dysfunction Scale and scores on the Haunting Type Experiences Index; and 2) Participants who score high on the Temporal Lobe Dysfunction Scale score higher on the Haunting Type Experiences Index than those who exhibit low scores on the Temporal Lobe Dysfunction Scale.

In order to examine the relationship between brain trauma and drug usage and temporal lobe symptoms, it was further hypothesised that 3) Participants who have experienced brain trauma, and previously used or presently use drugs, exhibit higher scores on the Temporal Lobe Dysfunction Scale than participants who fit only one of the above criteria and those who fit neither. It may follow that scores on the Haunting Type Experiences Index increase as incidence of brain trauma or drug usage increases; however, such was not formally hypothesised.

In an attempt to replicate the findings of Palmer and Neppe (2003), it was expected that 4) Females exhibit higher scores on the Temporal Lobe Dysfunction Scale than do males.

Lastly, it was hypothesised that 5) Undergraduates majoring in Fine Arts score higher on the Haunting Type Experiences Index than undergraduates majoring in Psychology. Such a difference was expected because when confronted with anomalous experiences, the former may assign agency to paranormal factors, due to creative processing of stimuli (see, e.g., Brugger, 2001), while the latter may dismiss such experiences as coincidental, or may be more inclined to invoke natural explanations. Although this expectation appears to be intuitively sound, there are no prior investigations into this matter of which the author is aware, and thus this hypothesis (5) was treated as exploratory.

METHOD

Participants

Sixty-three university undergraduates in Montreal, Quebec, participated in the present study. All were required to be fulfilling a major in either Fine Arts or Psychology and to report not having been previously diagnosed with any psychological or neurological disorders by a clinician or other professional. Participants were recruited from required courses of their respective majors and all were in their first or second year of study. Any with confounding programs of study were not included. One participant did not meet the inclusion criteria; the analyses subsequently included the data points of 62 participants [17 to 48 years of age (M = 22.9, SD = 7.1)]. The sample was divided into sub-samples demarcated by gender (47 females and 15 males) and program of study (26 Fine Arts and 36 Psychology undergraduates) for certain statistical analyses.

Materials

Personal History Questionnaire inquired about the participant's age, gender, and program of study. Previous diagnoses of psychological or neurological disorders, incidence of brain injuries, and past/present drug usage was solicited. Participants were rated on an independent scale (0 to 2), which assessed incidence of brain trauma and/or drug usage. Following the criteria of Palmer and Neppe (2003), one point was awarded if the participant had suffered a brain tumour, brain disease, or head injury resulting in the loss of consciousness, concussion, or amnesia. A second point was awarded if the participant had previously or was currently partaking in recreational drug usage of the following sort: *marijuana*: over the course of many years or frequently over shorter periods of time; *hallucinogens* (LSD, mescaline, or PCP): three or more times; *amphetamines*: for a period of six months or greater or a minimum of thirty times (unless prescribed); *opiates*: for a period of six months or more (unless prescribed and patient not an addict) (Palmer & Neppe, 2003).

Temporal Lobe Dysfunction Scale devised by Vernon Neppe (Palmer & Neppe, 2003), consists of sixteen items, inquiring about the frequency of specific symptoms suggestive of temporal lobe dysfunction. Palmer and Neppe (2003) report that this scale has a Spearman-Brown odd-even reliability of .86 based on a sample of 100 patients of the latter author's neuropsychiatric clinic. Participants were asked to report the higher frequency (past or present) with which they had experienced each specific symptom. The maximum score per item is 1 and the scoring range for the scale extends from 0 to 16. For scoring methods and other details concerning this questionnaire, see Palmer and Neppe (2003).

Haunting Type Experiences Index devised by the author, consists of 10 items inquiring about typical haunting phenomena. Participants were instructed to answer each item with a number from 0 to 4 representing the frequency with which they had had the particular experience, with 0 representing "never" and 4 representing "very often". Response numbers of 0, 1, 2, 3 and 4 received 0, 0.25, 0.5, 0.75 and 1 point, respectively. A maximum of 1 point is awarded per item and the scoring range extends from 0 to 10. When there were items in which participants can answer with two numbers, reporting frequency of two specific experiences within one question (e.g. hearing voices and footsteps), the scores are combined. However, 1 remains the highest score obtainable for a single item. For further details, see the APPENDIX.

Procedure

Participants independently met the experimenter, in one of two university libraries and were told that the purpose of the study was to assess the relationship between temporal lobe function and haunting type experiences. They were verbally given instructions, told the conditions of their participation and then signed a consent form, which summarised the above in written form.

Upon completion of written consent, participants were administered each of the three questionnaires in the following order: Personal History Questionnaire, Temporal Lobe Dysfunction Scale and Haunting Type Experiences Index. After a questionnaire was completed, the experimenter read over the respective questionnaire with the participant (if necessary) to make sure that all of the questions had been understood, and that the participant had properly answered in accordance with her or his lived experience. Any changes in participants' responses at this stage were accompanied by the initials of both the participant and the experimenter in the right hand margin of the questionnaire, in order to verify both parties' agreement on the change (i.e., so that if an independent co-experimenter examined the questionnaires, s/he could note that a change on an item had not been carried out by the original experimenter).[1] Participants were then

[1] The Temporal Lobe Dysfunction Scale was administered to participants first because it has multiple items with difficult terminologies. *Only* after the Scale was completed by the participant and any items were explained was the Haunting Type Experiences Index administered. Accordingly, the experimenter could not have influenced a participant's score on the Temporal Lobe Dysfunction Scale in knowledge of her or his score on the Haunting Type Experiences Index. A counterbalanced method would have

allowed to ask any questions pertaining to the study and were asked not to disclose any information to colleagues or friends.

RESULTS

Separate statistical analyses were conducted to test the five hypotheses. Independent and dependent variables fluctuated depending on the test conducted. An alpha level of .05 was used for all analyses. The scores on the Temporal Lobe Dysfunction Scale and the Haunting Type Experiences Index for the tested sample conformed to a normal distribution (see Table 1 for further details).

To test the central Hypotheses 1 and 2 that there exists a relationship between temporal lobe lability and haunting type experiences, first scores on the Temporal Lobe Dysfunction Scale and Haunting Type Experiences Index were subjected to a two-tailed Pearson correlational analysis. A significant positive correlation of .45 ($p < .001$) was found. Next, an independent *t*-test (two-tailed) was used to compare mean scores on the Haunting Type Experiences Index of those scoring high on the Temporal Lobe Dysfunction Scale [top 50%, $n = 31$, ($M_{\text{Haunting Type Experiences}} = 2.63$, $SD = 1.61$)] with those scoring low on the Temporal Lobe Dysfunction Scale [bottom 50%, ($M_{\text{Haunting Type Experiences}} = 1.19$, $SD = 0.96$). As expected, the difference between the groups was statistically significant ($t[60] = 4.27$, $p < .001$).

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allowed room for such an experimenter effect, hence the reason why such a method was not used.

Although the experimenter could have influenced participants' scores on the Haunting Type Experiences Index after having a reasonable estimate of their scores on the Temporal Lobe Dysfunction Scale, this is unlikely. The Haunting Type Experiences Index is quite simple for lay persons to understand; thus the number of participants who had questions pertaining to its items were few. Upon investigation, we find that 27 participants made no changes to either questionnaire; 24 only to the Temporal Lobe Dysfunction Scale; 1 only to the Haunting Type Experiences Index; and 10 made changes to both questionnaires. The author examined the questionnaires of participants who made changes, and calculated the scores before the changes. The unchanged scores vary little from the changed scores and *post hoc* analyses reveal that the same hypotheses remain supported. It is concluded that the methodology employed in the present study, though unorthodox, was firstly, beneficial in the retrieval of correct scores and secondly, did not allow an experimenter effect.

Table 1.
Means and standard deviations on the Research Measures for the Entire Sample (N = 62), and for the sub-samples of Females (N = 47), Males (N = 15), Fine Arts Majors (N = 26), and Psychology Majors (N = 36).

Sample	**Temporal Lobe Dysfunction Scale**	**Haunting Type Experiences Index**
	***M* (*SD*)**	***M* (*SD*)**
Entire sample	3.35 (2.40)	1.91 (1.50)
Female	3.38 (2.47)	1.91 (1.53)
Male	3.27 (2.25)	1.92 (1.45)
Fine Arts	3.13 (1.60)	1.83 (1.18)
Psychology	3.52 (2.86)	1.97 (1.71)

In order to test Hypothesis 3 that scores on the Temporal Lobe Dysfunction Scale are positively associated with incidence of brain trauma and drug usage, a one-way Analysis of Variance (ANOVA) was conducted. Scores on the Temporal Lobe Dysfunction Scale acted as the dependent variable and the trauma/drug rating acted as the independent variable, dividing the tested sample of scores into three groups depending on the rating assigned to each participant. No significant relationship was found between brain trauma/drug usage and scores on the Temporal Lobe Dysfunction Scale, $F(2, 61) = 2.12$, $p = .13$. A second ANOVA using scores on the Haunting Type Experiences Index as the dependent variable was also non-significant, $F(2, 61) = 0.44$, $p = .65$. See Table 2 for descriptive statistics.

To test Hypothesis 4 that females would exhibit more temporal lobe symptoms than males, the females' mean score on the Temporal Lobe Dysfunction Scale was compared with the mean score of the males. A *t*-test revealed no significant difference between the two genders, $t(60) = 0.16$, $p = .87$, two-tailed. Similarly, no significant gender differences were found with scores on the Haunting Type Experiences Index, $t(60) = 0.02$, $p = .99$, two-tailed.

Table 2.
Means and standard deviations on the Research Measures for the Entire Sample (N = 62) and for the brain trauma/drug usage sub-samples of 0 (no brain trauma or drug usage) (N = 25), 1 (brain trauma or drug usage) (N = 27), and 2 (brain trauma and drug usage) (N = 10).

	Brain Trauma and Drug Usage			
Sample	**0**	**1**	**2**	***M***
Temporal Lobe Dysfunction Scale	2.61 (2.15)	3.80 (2.54)	4.03 (2.36)	3.35 (2.40)
Haunting Type Experiences Index	1.71 (1.30)	2.10 (1.76)	1.90 (1.26)	1.91 (1.50)

To assess Hypothesis 5 that Fine Arts undergraduates report more Haunting Type Experiences than Psychology undergraduates, the Fine Arts undergraduates' mean score on the Haunting Type Experiences Index was compared to the mean score of the Psychology undergraduates using an independent *t*-test (two-tailed). There was no significant difference, $t(60) = 0.37$, $p = .71$. Similarly, another *t*-test comparing the mean scores of the Fine Arts and Psychology undergraduates on the Temporal Lobe Dysfunction Scale was non-significant, $t(60) = 0.64$, $p = .53$.

DISCUSSION

The findings of this study suggest, to a moderate degree, a relationship between temporal lobe lability and subjective haunting type experiences. Thus, the present results garner further support for the temporal lobe hypothesis, which asserts that anomalous experiences directly result from the physiological effects of temporal lobe lability or that temporal lobe lability may facilitate their occurrence, and that subjective haunting type experiences follow specifically from temporal (limbic) lobe microseizuring (Persinger & Koren, 2001b). This study further lends credence to previous research linking subjective paranormal experiences to temporal lobe lability, but specifies that link to haunting phenomena in

particular. The findings of Neppe (1983), Palmer and Neppe (2003), Persinger (1984), and Persinger and Valliant (1985) were each conceptually replicated in this study. Furthermore, there have been no strong inconsistencies among the findings across various tested samples, studies and experimenters. Such consistency implies evidential support of the temporal lobe hypothesis.

There did not appear to be a relationship between brain injury and/or drug usage and temporal lobe symptoms and haunting type experiences in this study. The inconsistent relationship between brain trauma and/or drug usage and temporal lobe symptoms was also reported by Palmer and Neppe (2003), and therefore, it may not necessarily be an artifact of the present study. However, scores on the Temporal Lobe Dysfunction Scale consistently increased with ratings on the measure of brain trauma/drug usage. This may suggest a modest effect; thus it is posited that further research, employing larger sample sizes, will be able more adequately to test whether such factors are associated with an increase in temporal lobe symptoms. Furthermore, there was no differentiation made in the latter, nor the present study, between brain trauma and drug use. A further analysis of the severity of brain injuries and drug usage of the participants in this study is planned. The criteria outlined by Palmer and Neppe (2003) may likewise be too strict or conservative; an analysis of the data of this study may be able to justify an adjustment of the criteria.

A minor inconsistency with the findings of Palmer and Neppe (2003) is that females did not exhibit a greater number of temporal lobe symptoms than did males in this study. The latter authors contended that the difference in scores on the Temporal Lobe Dysfunction Scale between genders may have been an artifact of the large female sub-sample within the clinical population tested. The present study supports such a contention; however, in this study, the male sub-sample was drastically smaller than the female sub-sample. This finding may have thus been an artifact of this difference. It is contended that future research with larger, equal sub-samples is necessary to test further such a hypothesis.

A second reason why the gender difference found by Palmer and Neppe (2003) was not replicated may be because the latter study used a clinical sample, while in the present study an undergraduate sample was tested. The gender difference may apply only to populations reporting excessive numbers of temporal lobe symptoms. That is, it may only be present within populations of persons with temporal lobe dysfunction.

Contrary to expectations, Fine Arts undergraduates did not exhibit higher scores on the Haunting Type Experiences Index than did Psychology undergraduates. One explanation for this failure to differ might be the loose demarcation criterion for creative and control samples. Accordingly, a

better approach to the issue of whether creativity affects the subjective incidence of haunting type experiences or the propensity to report them, is to use stricter (i.e., ordinal rather than nominal) demarcation criteria, such as creativity measurements.

It is questionable whether the present findings are generalisable. For example, the small sample size is complicated by the use of self-selected undergraduates. The link between temporal lobe lability and subjective paranormal experiences has been consistent across various experiments, but the sample sizes across all of these studies have been quite small; thus further research is warranted. The hypotheses that were not supported in the present study likewise necessitate further research before they are completely disregarded.

The exclusion criteria of having a psychological/neurological disorder may have been ineffective, due to its dependence on the participants' subjective reports. In future research, stricter criteria pertaining to psychological/neurological disorders should be employed in order to eliminate delusions and hallucinations not associated with temporal lobe lability, and which may therefore act as confounding variables in an assessment of the temporal lobe hypothesis.

The method of questionnaire administration used in this study is unorthodox. The use of a scale which assesses temporal lobe lability with easily understood items would allow for a counterbalanced order of administration, and thus would be more favourable in future tests of the temporal lobe hypothesis.

The Haunting Type Experiences Index was subjected to an alpha measurement of reliability. The resulting alpha level ($\alpha = .74$) suggests that the Index has satisfactory internal consistency, but its construct validity has yet to be established. Although a few haunting type experiences (most notably, apparitional sightings) were included in the scales employed in the previous literature assessing the link between temporal lobe symptoms and subjective paranormal experiences, such studies did not exhaust the numerous varieties of haunting type experiences that witnesses have reported in spontaneous cases. Accordingly, the findings of this study should be regarded as tentative until the Haunting Type Experiences Index is subjected to detailed psychometric tests, which are being planned.

The role of cognition in the elicitation of subjective haunting type experiences, such as the mediation of contextual variables that might have been present during participants' experiences (Lange & Houran, 2001; Lange, Houran, Harte, & Havens, 1996), must not be underestimated. Likewise, the elicitation of haunting type experiences by interactions among various physical factors, such as background ionising radiation or infrasound (Tandy, 2000; Tandy & Lawrence, 1998) and the experient's

neurochemistry (for a review, see Williams, 2001) must neither be ignored. Such factors indicate that not all haunting type experiences are produced by magnetic field-neurological interactions, but rather such findings demand that we acknowledge that the magnetic model cannot stand as an all-encompassing model of haunting phenomena. However, we may still posit that the temporal lobes are implicated in *many* haunting type experiences no matter the means by which the latter are elicited.

This study found that persons reporting high numbers and/or frequencies of temporal lobe symptoms recounted more haunting type experiences than those reporting few and/or infrequent temporal lobe symptoms or no temporal lobe symptoms. This reinforces a close association between temporal lobe lability and haunting type experiences and, more generally, subjective paranormal experiences. Thus, these findings warrant further research into the mechanisms involved in haunting type experiences and conjectures regarding their neurophysiological correlates and those of other anomalous experiences.

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APPENDIX

HAUNTING TYPE EXPERIENCES INDEX

Frequency of occurrence (both recent and past experience):

Rating scale:

(0) "never"; (1) "once"; (2) "several times"; (3) "often"; (4) "very often"

1) Have you ever seen an apparition (ghost)?

2) Have you ever heard strange noises for which you could not find a normal explanation? ( ) footsteps; ( ) voice(s); ( ) knocking/pounding sound; ( ) music;
( ) incomprehensible sound; ( ) other _____

3) Have you ever sensed a "presence" or felt as though there was some kind of disembodied being or entity within your immediate vicinity?

4) Have you ever felt as if a deceased person or disembodied being was trying to communicate with you?

5) Have you ever felt a sense of fear for which you had no rational explanation, and that you felt was caused by something inexplicable within your immediate vicinity?

6) Have you ever experienced any specific tactile (touch) sensations for which you had no normal explanation?
( ) felt like you were being touched by another person; ( ) felt a tingling sensation;
( ) felt body hairs standing on end; ( ) other _____
If "yes," on what area(s) of your body did you feel such a sensation?

7) Have you ever found objects in drastically different places from where you had last put them, when no one else had been in the room and/or the movement of objects could not be explained by normal means?
( ) found various objects strewn about; ( ) found object(s) in strange positions or in places where they would have not been placed; ( ) other _____

8) Have you ever witnessed an object move seemingly of its own volition or without any apparent cause?
( ) door opening on its own, with no normal explanation; ( ) other _____

9) Have you ever felt any strange thermal (temperature-related) sensations, for which you had no normal explanation?
( ) a cold gust of wind; ( ) a rapid, distinct change in temperature;
( ) other _____
If "yes," on what area(s) of your body did you feel such a sensation?

10) Have you ever witnessed any strange electrical malfunctions, for which you could not posit an explanation?
( ) lights or other appliances turning on/off; ( ) channels on a television/radio changing seemingly by themselves; ( ) doorbell ringing itself; ( ) other _____