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ELF field mediation in spontaneous PSI events: direct information transfer or conditioned elicitation?

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The possible mechanisms by which ELF (extremely low frequency) electromagnetic fields generated in the geophysical-meteorological environment could mediate spontaneous telepathy-clairvoyant (T-C) behaviors are discussed. One model involves direct information transfer by ELF fields between the putative agent and percipient; however this option is limited by the necessity for wide area modification of the ELF signal by the agent's condition and by the low bit rate of ELF fields. The second model involves ELF fields as a third factor that evokes behaviors in both the "agent" and "percipient" independently. Due to their incidental presence during the display of particular shared behaviors by person *A* and person *B*, ELF fields would become conditioned stimuli or discriminative stimuli. The later presentation of these ELF stimuli, when *A* and *B* are separated by significant distances, would evoke independently in *A* and *B* the display of those or related behaviors. In this model, traditional designation of "agent" or "percipient" would be irrelevant since temporal relationships (including apparent precognitive patterns) reflect only response latencies to the field's presence. Predictions, advantages, limitations and experimental verification of these mechanisms are discussed.

An essential problem for parapsychologists concerned with telepathy-clairvoyance (T-C) is the isolation and experimental simulation of the mechanism by which information traverses some point *A* to some point *B* without using conventional sense modes or stimulus sources. One approach to this problem assumes natural physical mechanisms are involved and that the apparent operations of T-C only appear to violate bio-environmental principles because of inadequate data availability or failure to clearly describe the phenomenon in an objective manner. Since alleged T-C involves long distances and opaque boundaries between the putative agent and percipient, the basic natural mechanisms which satisfy the conditions of a T-C mediator candidate (Persinger, 1975) are limited. Several experimenters (Kogan, 1968; Persinger, 1974a; Puthoff and Targ, 1976; Franklin, 1976; Bentov, 1977) have suggested naturally produced ELF (extremely low frequency) electric and magnetic fields as one means by which T-C

information could be generated; other geophysical sources would be included conceptually within this format (Persinger, 1975).

GENERAL ELF-EM CHARACTERISTICS

ELF electromagnetic (EM) field-waves and impulses occupy the frequency band between 3 Hz and 3 kHz while ULF (ultra low frequency) EM phenomena (<3 Hz) occupy adjacent wave bands (Campbell, 1967). Persinger, Ludwig and Ossenkopp (1973) suggest that the ELF range should include time-varying electric, magnetic or electromagnetic phenomena ranging between 0.01 Hz and 100 Hz since this range overlaps with major time-varying electromagnetic-chemical processes in living systems. There are myriad forms of natural ELF-EM events. Some general forms of ELF-EM phenomena are shown in Figure 1; other examples have been published elsewhere (Konig, 1974; Al'pert and Fligel, 1970).

Complex ELF-EM field-wave patterns are generated by or associated with a large variety of geophysical and meteorological events. Geomagnetic storms may produce prolonged periods or trains of ELF oscillations, called pearls, hydromagnetic emissions or PC 1 variations (Campbell, 1967), with amplitudes rarely more than 10^{-9}T (Tesla) or 1γ. These oscillations are associated with perturbations in the geomagnetic flux lines and may involve large areas in the order of 10^6km^2. However, almost identical signals can occur simultaneously at stations with conjugate locations involving much larger distances. More diffuse agitations can occur globally during geomagnetic storms.

ELF electric and magnetic field fluctuations are associated with local (in the order of 10^3 to 10^4km^2) weather conditions as well. According to Konig (1974), peak wave modes occur around 3 to 6 Hz and 0.5 Hz with strong harmonic contents. The temporal processes of these waves are usually irregular, with durations lasting often more than one hour. Values of over 10 V/m are frequently recorded during active periods although 100 mV/m and 10^{-6}T (in the air) amplitudes are median values. These waves could be recorded at all times with no obvious day-night differences. Conditions of low-lying clouds appeared to favor these ELF signals, at least in the Bavarian region.

One special form of ELF waves has been called the Schumann resonances which may be explained in terms of "standing waves" that occur in the earth-ionosphere cavity as a result of extremely low attenuation at ELF frequencies. A sample power spectra is shown in Figure 2. The basic Schumann frequency occurs around 7 Hz to 8 Hz with 10^{-9}T and 0.1 mV/m (distant field) components. Harmonics around 14.1, 20.3, 26.4 and 32.5 Hz

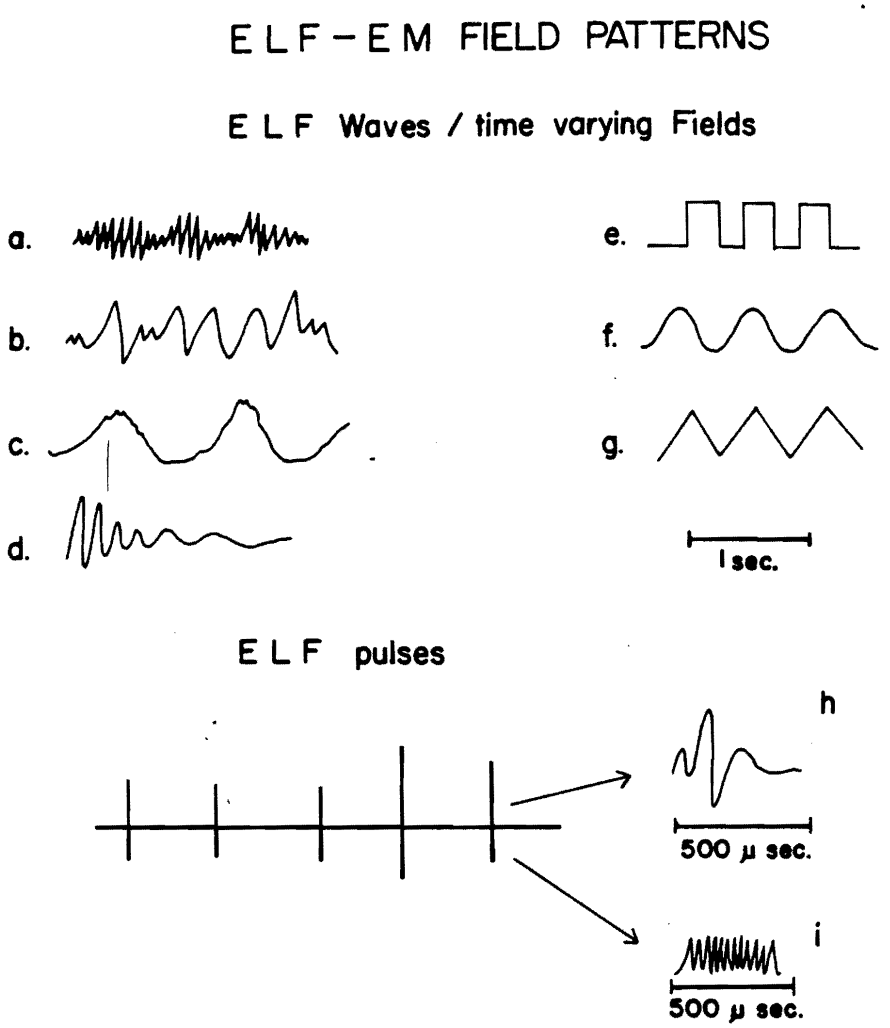

FIGURE 1 A few examples of different ELF (extremely low frequency) EM field patterns. Forms a. to d. represent natural patterns acçording to Konig (1974) while forms e. to g. indicate typical man-made productions. Type h, i illustrates higher frequency carriers of ELF pulses.

(Campbell, 1967) are displayed as well although resonances above the 20 Hz band are usually obscured by noise (Konig, 1974), including man-made sources. (telephone ringing systems, railway systems in Germany). The low attenuation of these ELF waves, between 0.5 db/1000 km to 0.8 db/Mm (depending upon the calculation) and the high penetrability (Ludwig, 1974) of typical housing structures used by human organisms are attractive features of this T-C mediator candidate. Frequencies propagated

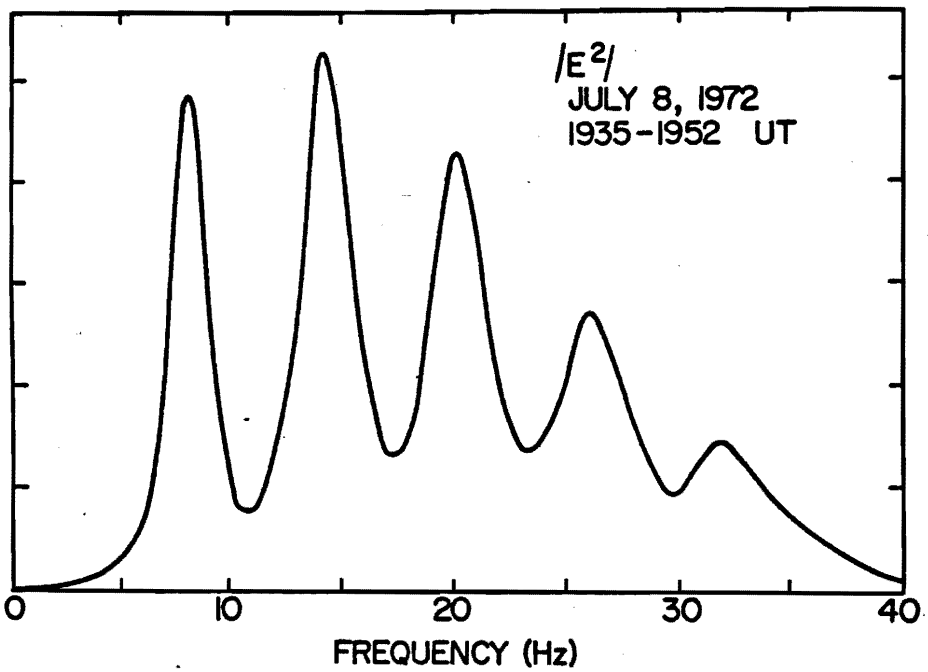

FIGURE 2 Sample power spectra for Schumann resonance frequencies (from Konig, 1974).

within the spherical wave guide may travel Mm without appreciable attenuation.

VLF or higher frequency EM waves may display pulses within the ELF range. These pulses may occur for very short times in the order of 10^{-4}s and may achieve very complex EP (evoked potential)-like patterns. These pulses include the "atmospherics" as well as local field-fluctuation categories and still maintain their low attenuation rates in air. Atmospherics, which are associated with many atmospheric electrical disturbances, demonstrate low attenuation and temporal shifts in wave shapes as a function of propagation distance. Their amplitudes, in the order of 10^{-9}T and 1 mV/m demonstrate a directional preference for propagation. Man-made ELF signals are typically highly localized (<1 km^2) time-varying fields. Proposed communication antennae would allow ELF wave propagation over global distances.

ELF PHENOMENA AND ORGANISMIC RESPONSES

Many organismic EM-chemical processes display time-variations that overlap the ELF waveband. The human heart (<1 Hz to 4 Hz), brain (<1 Hz to

30 Hz), and musculature (1 Hz to 1 kHz) display major power spectra within the ELF region. Several of the EEG (electroencephalographic) wave patterns are remarkedly similar in shape and order of amplitude (magnetic and electric components) to those associated with weather related ELF-EM signals (Konig, 1974). Such similarities suggest that biogenic-environmental ELF interactions could occur through resonance-like (Persinger, Ludwig and Ossenkopp, 1973) or lock and key mechanisms (Persinger, 1976). Resonance interaction would allow, theoretically at least, information transfer between the organism and distant environment; however, the quantitative values for such exchange have not been specified. Other possible mechanisms have been proposed and more typically reflect differences in level of discourse than fundamental differences of principle (Persinger, 1974d; Persinger, Ludwig and Ossenkopp, 1973).

If ELF waves are involved with T-C phenomena, then organismic conditions that facilitate response to (reception of) these fields should increase the probability of T-C experiences (Persinger, 1975). Assuming a resonance-like mechanism of interaction, organismic conditions in which biogenic ELF patterns predominate should enhance environmental ELF signal detection and T-C reports. If T-C information was associated with Schumann resonances, then: (1) periods with predominant alpha rhythm in the EEG profile, and (2) organismic conditions displaying "split" EEG power spectra typified by 7 Hz to 8 Hz and beta (14 Hz, 20 Hz) frequencies (e.g., some classifications of schizophrenia, geriatric progression, thyroid and related endocrine alterations), should probabilistically enhance T-C reporting. Spontaneous cases superficially support these contentions. Frequently the alleged percipient is engaging in day dreaming, relaxation, or some ritualistic motor task (washing dishes or driving a car) in which alpha rhythms would predominate. More specific statements could be made by comparing the technical literature on EEG-behavioral correlates with natural ELF-EM records.

ELF INTERACTIONS WITH AGENT AND PERCIPIENT

The conceptual relationships between the agent or object *(A)*, the percipient or reporter *(P)* and the geophysical mediator *(G)* are shown in Figure 3. A type 1 interaction would be a simple *A-G-P* relationship by which information from *A* modifies or is coded onto *G* and influences *P* some time and distance later. A type 2 interaction would be another example of a "third factor theory" whereby *G* would influence *A* and *P* separately at about the same time. Since *G* would not be apparent to either *A* or *P*, the conclusion of a direct *A-P* interaction would be likely but inaccurate.

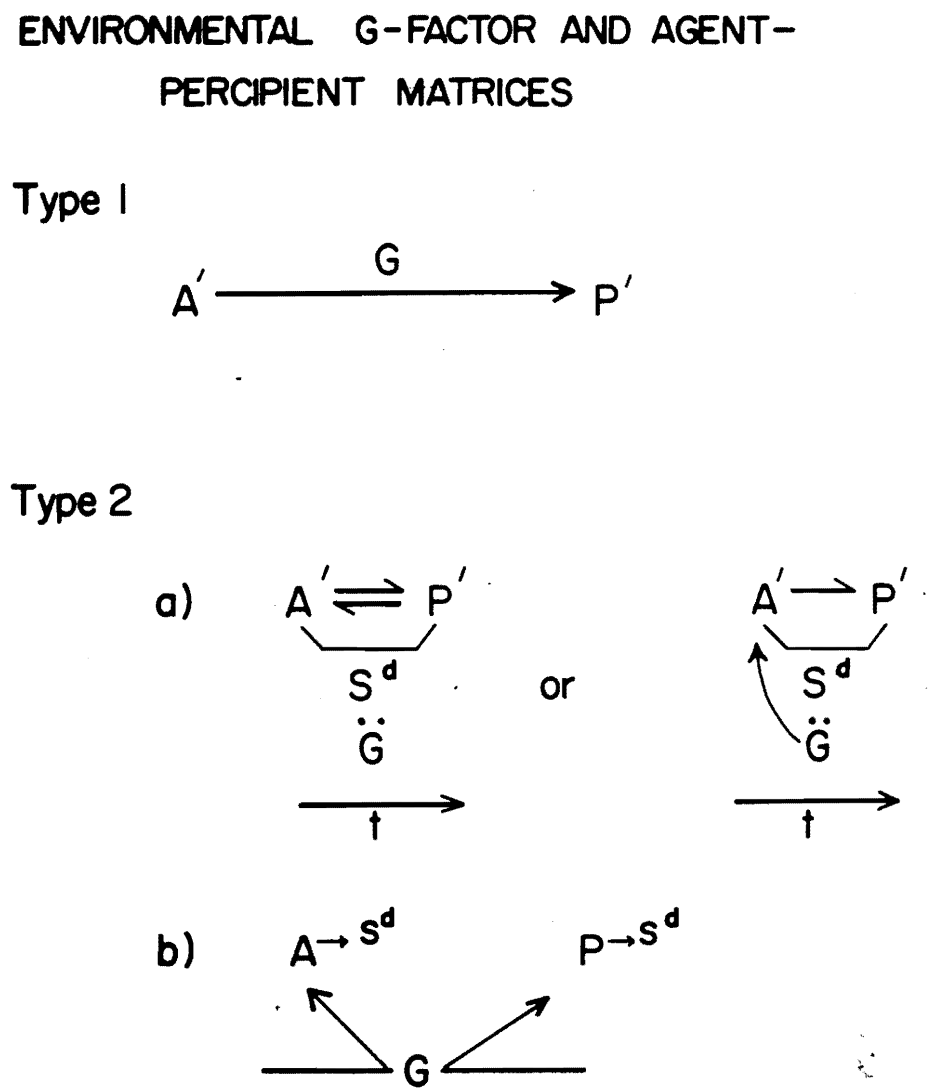

FIGURE 3 Representation of two types of mechanisms by which some *G*-factor (geophysical-meteorological ELF fields) might mediate spontaneous T-C events. Type 1 involves direct information transfer from the putative agent *(A′)* to the putative percipient *(P′)*. The Type 2 (a) model requires the role of previous learning whereby the *G*-factor becomes a conditioned stimulus or discriminative stimulus *(S^d)* for particular behaviors shared by *A′* and *P′*. Later presentation of the *G* (b), when *A′* and *P′* are separated by significant distances but still within *G* range, would elicit the *S^d*- related behaviors in both *A* and *P* independently.

The A-G-P theory: Type 1

This theory requires that information from the target or agent modifies the ELF wave-field, especially if one assumes that no previous association between some wave form of *G* and *A* has been learned by *P*. In other words, the percipient must directly respond to the modification of the ELF signal correlated with the agent's organismic condition.

Initial evaluation suggests that in principle information could be received from ELF waves. Using generous assumptions, elementary information theory indicates that ELF waves would have low information carrying capacity, in the order of 10^{-2} bits/s. These values are compatable with experimental data for some laboratory T-C experiments according to Puthoff and Targ (1976) who calculated the transmission rate of a 15 digit number (49.8 bits) through paranormal (Persinger, 1976) means to be 2.9×10^{-4} bit/s. In Kogan's (1968) experiments, an apparent distance dependence of information transfer occurred, ranging from 0.1 bit/s for *A*-*P* distances of < 1 km to 0.005 bit/s for *A*-*P* distances of 1000 km.

If T-C were mediated by ELF waves, then the information transfer process would be: (1) small in terms of bits, and/or (2) very long in terms of detection. Estimated maximum information capacity for spoken English is 50 bits/s assuming a 150,000 word vocabulary and a speaking rate of 300 words/min (Corso, 1967). A simple word passage involves about 100 bits of information while a simple geometric object can be described in macroscopic terms with about 60 bits of information (Franklin, 1976). Presumably more complicated objects, such as images of human beings or technical geometries (buildings, room furnishings) would require much larger amounts of information.

This difficulty can be obviated by: (1) increasing the ELF exposure duration or (2) "closure effects" displayed by *P*. If a subject was capable of receiving and storing 0.01 bit/s for 100 min, then 60 bits of information could be accumulated. Assuming more experimentally palatable periods of 10 minutes, ELF information could vary from 0.01 to 1 bit. Although the percipient could be exposed to the ELF signal for hours before sufficient information influenced appropriate response systems (awareness behaviors), more critical features would be: (1) the increment of time that the agent could maintain ELF "coding" and (2) *P*'s neural capability for "understanding" the signals.

Closure effects would allow the susceptible subject to "fill in the gaps" after receiving only a small portion of the transmitted information. Such phenomena are well documented with visual information, where partial stimuli (e.g., 4 right angles) presented for threshold durations are interpreted by the perceiver as a total object (e.g., a square). Closure would

attenuate the difficulties of large information requirements or exposure times for ELF-associated T-C.

However, there is still a problem of the mechanism by which the agent influences adjacent ELF waves since they would require modification or modulation by the object-body locus. Although not impossible theoretically, since the body can be considered an influential medium, the operation does not appear highly feasible. Any ELF modification within a small volume (e.g., the human body, in the order of 1 m^3) without some additional change in adjacent field-waves would require extremely precise directional localization of the percipient, even if *A* and *P* occupied conjugate loci. An as yet unspecified mechanism must exist to allow large lateral dispersions of the *A*-related information. There is another option.

The G as a third factor theory: Type 2

Much of paranormal behavior is associated with the implicit assumption that *A* and *P* are the primary and causal conditions of the T-C event. Within this context, something happening to *A* is somehow transmitted to *P*; the direction of the interaction is relevant only to the model employed. Other options are not invoked since it is further assumed that the stimulus events occurring around *A*, such as death or crisis, are specific only to the time and place of the *single* episode rather than to some more general pattern.

The type 2 option in Figure 3 indicates that some third factor *G* initiates changes independently in both *A* and *P*. In this situation, the environmental (geophysical-meteorological) factor *G* would initiate both the alleged "transmitted" information in *A* and the "paranormal" responses in *P*. Clearly, such a relationship would require shared reinforcement histories (shared experiences) between *A* and *P* in the presence of *G*. The basic operation would involve elementary learning principles such that the *G* factor becomes a conditioned stimulus (CS) or discriminative stimulus (S^d).

One simple application of this theory (Figure 3–2a, 1st option) would require the display of behaviors by either *A'* (the person who would later be called the agent) and *P'* (the person who would later be called the percipient) during the presence of *G* at least once. Emotional behaviors, such as response sequences associated with death, crisis, sex or related autonomic stimuli, would be more effective for recall and would require fewer pairings with *G*. Later presentation of *G* (Figure 3–2b) when *A'* and *P'* are separated by significant distances, would elicit independently in both *A* and *P* the display of responses associated with the initial learning situation. The conclusion of direct *A-P* communication would be an artifact of describing the event without including *G*.

For example, suppose *A'* and *P'* share a given response sequence such as

watching an emotional movie while some specific G factor is present. The initial presence of the G factor would be quite accidental and behaviorally "neutral". However, since G was contiguous with the learning situation, it would also acquire reinforcing capacities. Later A' and P' become separated by a significant distance that still includes the space of a potential G (with ELF G factors, distances in the order of 10^3 km would not be prohibitive). The occurrence of the specific G at that time would initiate responses (such as memories) about the shared experience (the emotional movie) in both the A and P, independently. Shortly thereafter, A might telephone P and relate the "sudden and intense remembering of the movie for no apparent reason" as well as the image of P (a significant reinforcer present during the initial learning situation). P might report a similar experience, that occurred about the same time, ± 30 min. The couple might conclude, erroneously, that some type of "personal exchange" had taken place.

A more complex application of the model (Figure 3–2a, 2nd option) would involve the G as a UCS (unconditioned stimulus) or related powerful stimulus (first order CS), that would actually initiate A' behaviors leading to typical T-C events (accidents, death). In this situation, the G would have elicited specific responses in A', for example, depression, proneness to accidents, agitation, while in the presence of P'. As a result, the G becomes a S^d to P to emit responses (memories) about A displaying the specific responses. If the display of the responses by A was aversive to P, then a conditioned suppression situation would arise. The G factor would be a cue to the later presentation of aversive stimuli (the behaviors of A'). During G presentation, P would display typical conditioned suppression paradigm behaviors like "anxiety," "foreboding of something bad about to happen," or general feelings of unspecified "negative anticipation." Quite likely, P would report difficulty in thinking during the G presentation period, except for thoughts directly paired with A'.

For example, suppose a potential A' responds with irritable-depression to some specific ELF component of a geomagnetic storm: G_x. Since geomagnetic storms are quite persistent in time, one would expect that A' would be exposed to G_x or stimuli that fall within the stimulus generalization gradient many times during adulthood. Members of the family would learn to anticipate, through incidental learning that the irritable-depression of A' is displayed during G_x. Incidental learning is a key feature here since isolation of or specification of G by P' would not be required for learning to occur, i.e., covert conditioning (Persinger, 1977). The decreasing involvement of immediate family, peripheral family, friends and acquaintances, a common gradient found in spontaneous psi accounts (Persinger, 1974a), would reflect the probability of being present for the pairing of G_x presentation and display of irritable-depression by A'.

Time after time the appropriate geomagnetic storm patterns are presented. During one of these periods, A' is separated from P' by a considerable distance, but still within the storm inclusion area. This particular time the storm is stronger than usual and the agent, driving alone, shows an increased susceptibility to depressive-agitation. The probability of an accident increases and the accident occurs. During this time, the same geomagnetic stimulus is presented to potential P's and in the most susceptible P' displays the behaviors associated with G_x. Since G_x has been associated with the display of undesirable/aversive behaviors by A', the geomagnetic storm acts as a CS to produce anxiety, vague feelings of anticipation and related diffuse, autonomic displays. As the period of G_x presentation continues P becomes more anxious and the autonomic activity increases. Since the particular sequence has been associated with A, the P begins to experience images about A in context of the anxiety. These contents would reflect the most recent aspects of the A (clothes, driving a car).

That geomagnetic perturbations can demonstrate UCS-like characteristics has been suggested by several authors. Friedman, Becker and Bachman (1963) have shown that geomagnetic perturbations are associated with increased agitation in psychiatric populations. Other correlational data have linked geomagnetic perturbations with disturbances in "mood" and proneness to self-destructive behaviors. Geomagnetic disturbances are correlated also with cardiovascular and autonomic variations that could contribute to the undesirable behaviors in the susceptible A'. These weak correlations in conjunction with laboratory human data, suggest that ELF G factors have the *potential* to be involved with operations depicted by this model. The experimental demonstration is another matter.

Traditionally, in spontaneous T-C cases, the A displays the apparent target behaviors first while the P responds to these stimuli at the same time or some time later, in the order of minutes to hours. If the person designated as P displays a psi response before the alleged event occurs to the designated A, then the conclusion of precognition might be made. It would appear that the P somehow "knew" the information before it happened to A.

In this model, the designation of who was the A and who was the P would be arbitrary. Since the G factor initiated responses independently in both persons, the use of the traditional A, P labels would be spurious. A or P capacity would reflect merely the response latency of the organism to G; if the male of the couple was displaying behaviors more favorable to the display of the conditioned responses in the presence of G before the female, then the male might be called A. On the other hand, if the female had been displaying behaviors that increased her susceptibility to G, then she might be called the A.

If G maintained the reinforcing potencies to initiate specific behaviors that lead to a crisis event in one of the two organisms, then the response of the other organism to G first might result in the conclusion of precognition. In this situation, the G factor would initiate its S^d characteristics to the P' first because of his/her increased susceptibility (shorter response latency) to the presence of G. Later the person to be affected, A', would enter a behavioral condition allowing G to initiate S^d related responses (e.g., depression, agitation), thus increasing the probability that a related event (e.g., accident) would occur. The conclusion of precognition would be inaccurate; rather the P' has responded first to a stimulus (G), presented more or less simultaneously to both A' and P' for a significant duration.

The occurrence of S^d effects from the G factor would be compatible with some puzzling aspects of spontaneous precognition and T-C events. These phenomena display similar shaped cumulative response curves over time (Persinger, 1974a). Typical temporal delays of 0.01 to 3 days exist between the precognitive experience and the occurrence of the event or the event and the T-C experience. Within the context of this model, these values would reflect the periods of time by which the typical G factor was presented independently to both the A' and P'.

DIFFICULTIES WITH THE ELF-EM THEORY AND CONCLUSIONS

A major limitation of ELF-EM involvement in the type I G factor theory discussed in this paper involves the number of ELF-EM incremental characteristics: amplitude, frequency, rise time, peak time, superimposed ripples or wave trains, that the P can discriminate as different. As mentioned previously, organismic discrimination is important here, not "awareness" of the presence or absence of ELF fields. Although the discrimination of required information loads within complex wave forms now appears unlikely, sufficient information might be gleaned by using 0,1 ELF signal modes. Assuming reaction time differences to be a model for discrimination, experimental data and interpretations by Konig (1971) indicate that human subjects display significantly altered reaction times to: (1) the presence or absence of weak 4 Hz or 10 Hz electric fields and (2) frequency shifts of only 1 Hz at field strengths of 2 mV/50 cm. However, a 0,1-like detection mechanism would necessitate an organismic capacity to distinguish temporal patterns. The maximum time increment within which a specific sequence of 0,1 ELF signals can be maintained (short term memory), compared and discriminated from other sequences appears biologically prohibitive.

The type 2 G factor theory has less requirement for large numbers of

discriminable ELF-EM characteristics since the majority of information is already within *P* as memory; the ELF signal is only a trigger. This operation is analogous to the presentation of a single four-letter curse word, which involves very little stimulus energy, to a person with the appropriate conditioning history. Massive autonomic and verbal sequences, at energy levels orders of magnitude above the stimulus strength, would be evoked in a cascading manner. The important requirement for the type 2 model is that the organism merely can respond to the ELF field. Massive or diverse information capacity of the ELF field is not required since this factor would reflect the diverse learning histories of *A*s and *P*s. In fact, the same ELF wave pattern, that had become a S^d for hundreds of different *A*-*P* pairs, could evoke the display of hundreds of different, specific responses.

At present the greatest weakness of the ELF theory in spontaneous T-C cases is the lack of experimental detection data. A few non-human animal studies have suggested that ELF-EM (and sonic) fields may effectively enter the learning paradigm, predominantly respondent conditioning formats (Persinger, 1974b). Quite frankly the experimental data for human subjects have not demonstrated sufficient information properties of ELF fields. Frequency or amplitude-dependent changes in reaction time are important first steps. However what must be established clearly, in order to substantiate the ELF hypothesis as a viable T-C model, is the capacity for these fields to become reliable CSs or *S*δs for specific responses within highly controlled experimental, psi-simulating situations.

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REFEREE'S COMMENTS ON M. A. PERSINGER'S PAPER

M. A. Persinger's paper discusses the possibility of environmental ELF fields mediating telepathy and clairvoyance (T-C). He presents two possible models: (i) direct transfer of the ELF signal between sender-receiver or (ii) indirect transfer mediated by a conditioned elicitation mechanism.

The first section of the paper contains a very interesting and thorough description of ELF-mediated events naturally occurring in our environment. Persinger then goes on to discuss the processes in the human body which overlap the ELF waveband. He puts forward that if T-C information transfer was associated with Schumann resonances, then two effects observable in the subjects should enhance the reporting of the phenomena: (a) alpha-predominant EEG's (b) split EEG power spectra (at 7–8 Hz and 14–20 Hz). The claim that "spontaneous cases superficially support these contentions" seems indeed superficial as most of these cases are of an anecdotal interest only.

Persinger then discusses separately his two models:

i) The receiver must directly respond to the modification of the ELF signal correlated with the sender's organismic condition. In this case, the information transmission rate would be small (Persinger quotes a figure of 10^{-2} bits/sec) and the process would be very long in terms of detection. Persinger does not give details of how he calculates such an information transmission rate for ELF waves, therefore its comparison with experimental results is only intented to give an idea of the order of magnitude involved. It is not clear that the problems that arise from this model can be solved by increasing

the ELF exposure duration or by "closure effects" displayed by the receiver. The duration of the exposure is only relevant if the sender can maintain the "coding" of the signal and the receiver is able to decode the signal after having registered it over such a length of time. This seems to involve a highly sophisticated operation by the human body; but Persinger suggests no mechanisms which could justify or support his theory and he himself says it is theoretically "not highly feasible." Another problem is that the body is known to respond to varying stimuli and not to stimuli that it receives over a long period of time since it develops adaptation mechanisms as a self-protecting device.

ii) The second model discusses a factor G (of an environmental nature) which could trigger-off changes independently in both sender and receiver. This factor G (conditioned or discriminative stimulus) would initiate the alleged "transmitted" information in the sender and the "paranormal" responses in the receiver. Although an interesting speculation, Persinger does not manage to support it strongly. In fact, his example about the couple seeing the same movie shows this: if the couple concludes erroneously that a "personal exchange" has taken place, Persinger concludes erroneously that the stimulus G has produced or evoked in both persons the same response simultaneously. It is clear that this conclusion is as far-fetched as the "personal exchange" conclusion discarded by Persinger. Why would both persons have the *same* response to a stimulus (which they have shared) at the *same* time (or ± 30 minutes according to Persinger?) Counterexamples in everyday life abound which could easily refute this assumption. The same can be said about the example of the geomagnetic storm. Persinger's arguments seem to be stretched beyond credibility.

Finally, Persinger points out rightly that, apart from theorecitcal problems, ELF signals from humans during T-C occurrences have not been detected (Konig's results have not been rigourously achieved nor repeated), or have not been found to have sufficient information content.

PERSINGER's reply

Verbal sequences displayed to rebut verbal sequences are of little practical value, although these behaviors unfortunately compose the bulk of parapsycholigical literature. My paper is merely a behavioral exercise to develop, in principle, basic operations and limitations of two ELF electric/magnetic field options. There is no attempt to defend the ELF model by either semantic proof or empirical support. Any usefulness of the model will certainly not be based upon suave semantics or raving referees, but upon its

capacity to predict and experimentally manipulate T-C ("telepathic-clairvoyant") behaviors. Stimulus operations of the type II model are no more "far-fetched" at the conceptual level than the existence of paranormal events themselves.

The essential behavioral operation of the type II model involves a discriminative stimulus-like situation by which a stimulus (with the capacity to occupy very large areas of organismic space) paired with shared experiences of the putative agent and percipient is presented at some post-pairing period. Behaviorally, the phenomenon is simple and the casual environment is replete with such episodes. Since the reviewer has failed to understand this simple learning episode, perhaps another example would facilitate acquisition, assuming there are no organismic deficits. Suppose two people telephone each other at 3.13 p.m. each day and that there are no (or few) other associations with that time. After a number of pairings, the stimulus: 3.13 p.m. (or a related configuration that falls within the stimulus generalization gradient) would be sufficient to allow person *A*-related responses to be displayed by person *B* and person *B*-related responses to be displayed by person *A*. Just looking at any time apparatus demonstrating 3.13 p.m. could evoke "thoughts" about the other person since that stimulus was frequently present when the two people engaged in conversation.

A similar situation would exist in some T-C cases, only the analogue of 3.13 p.m. would be some geophysical stimulus that had the physical capacity for wide-area application. If that stimulus had been present at some time in the shared reinforcement history of both individuals when one or both were engaged in some specific activity, later presentation of that geophysical stimulus would increase the probability that responses about that situation (and hence association with the other person) would be displayed. Since psi events most frequently involve autonomically arousing behaviors, the initial acquisition could take place in a single trial. No doubt there are numerous occasions when shared stimuli do not evoke similar responses in both organisms. However alleged T-C experiences are extremely infrequent when compared to the total number of response sequences displayed by a human organism during its lifetime. Such experiences would be expected as a consequence of the infrequent (and hence autonomically arousing, anxiety producing, "special") nature of the actual display of the appropriate responses by both organisms to the particular geophysical stimulus episode.