A Look for a Presentiment Model's Reasonable Parameters[1]

Ephraim Y. Levin
Independent Researcher

Abstract. Recently, I proposed an orthodox quantum mechanics' justification for the presentiment effect, which claims that the very existence of the presentiment effect points to the correctness of the orthodox interpretation of quantum mechanics. I carried out the mathematical calculations within the framework of the decoherent histories theory and their results depended on two unknown parameters. I suggested that these parameters can be determined by fitting empirical measurements and, indeed, as an example, such a rough fit was tried. I noted that with certain values the effect fluctuates and may have a surprising long duration. The current paper reconsiders these parameters' preferred values in regular presentiment experiments. I conclude that most probably these parameters should have values that under ideal resolution would reproduce time symmetry of the effect and tiny (if any) fluctuation. I blame the experimental method's poor resolution between partially overlapping sentiments, the existence of queued, perhaps prevailing, previous sentiments, and operation of positive feedback nervous loops after emotional stimuli for the empirical salient suppressed symmetry and finite duration of the effect. Certain other implications of these preferred values are examined and seem to justify these values in regular presentiment tests, which do not preclude other values under peculiar tests' designs and peculiar participants.

*Keywords***:** wavefunction collapse; consciousness; presentiment; orthodox interpretation of quantum mechanics; effective past; decoherent histories; time symmetry; quantum reduction

---

[1] Address correspondence to: Ephraim Levin, Ph. D., Yoni Netanyahu 30, Givat Shmuel 5442504, Israel, ephraimlevin50@gmail.com

https://doi.org/10.31156/jaex.26462

Highlights

- The values of free parameters of the theoretical quantum model recently suggested to explain the presentiment effect are theoretically reconsidered for the more regular presentiment tests. This study focuses on the size of the fluctuating term.
- I propose preferred values that effectively result in no (or tiny) fluctuation. With these values, exact time symmetry theoretically exists in the idealized model and the frequency of the fluctuation appears insignificant.
- The deterioration of the exact theoretical time symmetry under empirical conditions to a mere (salient) rough time symmetry, as well as the finite effect's duration, is attributed to the poor resolution between (fully or partially overlapping) sentiments of the experimental method used to detect presentiment and to positive nervous feedback while apprehending emotional stimulus.
- Certain other implications of these reasonable values are examined and seem to justify these values for regular presentiment tests.

The presentiment effect (PSE) can be considered among the more reliable within those covered under the umbrella term *psi*. The effect is small and embedded in strong noise, with an estimated effect size of 0.28 and a 95% confidence interval of 0.18-0.38; averaging improves the signal to noise ratio and allows the difference to become statistically significant, over 6σ (Duggan & Tressoldi, 2018). Various potential mechanisms to explain the surprising effect as an experimental artifact have been discussed and examined over the years, and can be reasonably rejected (Mossbridge & Radin, 2018).

Radin (2016) provides a concise review of the presentiment experiments. In brief, the PSE can be described as an unconscious phenomenon in which pre-stimulus physiological responses mirror, to a lesser degree, the post-stimulus responses. The PSE's mirroring feature is stressed, for example, by Bierman (2008, p. 36), "Incidental observations of the noisy skin conductance at the trial level showed a remarkable form symmetry before and after the stimulus. For instance, if the response showed a double bump there appeared to be also a double bump, though smaller in amplitude, before the stimulus. Double response bumps may occur, for instance, when a picture shows a lot of redness but it takes some time to find out what really causes all that color (perhaps blood)."

Most PSE experiments looked for (and detected) the effect over a few seconds (say, up to 10 seconds) before the stimuli presentations. Exceptional longer periods were seldom examined. The participants in these experiments and the tests' design were peculiar. In one example, Alvarez (2016) examined planarian worms' (precognitive) behavior and found that (p. 222) "Frequencies of Head Movements behavior during the two observation periods (one min before and immediately before stimulation) for the experimental planarians more than doubled that of values during the corresponding observation periods for the control subjects." In another case, Radin (2023) analyzed 13 years of daily Twitter sentiment data in 10 languages. The sentiment data was examined *two weeks* prior to events assessed as significantly negative and unpredictable (including acts of terrorism, mass shootings, unexpected deaths of celebrities, etc.). Results of the analysis were statistically significant (p = .001), suggesting the existence of a form of a long-time collective presentiment.

Bierman (2006) suggested that for a PSE to occur the mind has to *consciously* perceive the content of the stimulus. His suggestion was based on empirical data. While performing a successful re-examination of published data (that originally had been collected by Murphy and Zajonc, 1993, for other purposes than showing a PSE) to look for a previously unnoticed PSE, Bierman realized that although a previously unnoticed PSE was indeed buried in the data when the pictures' exposure time was long enough, no PSE was present in the data when the pictures' exposure time was less than about 100 msec. Since less than about 100 msec is too short for a full comprehension of the contents and meaning of a picture, Bierman concluded that for the PSE to appear, conscious observation is apparently a requirement. Based on this insight concerning the crucial role played in the PSE by consciousness Bierman postulated the pivotal role of the moment at which conscious perception is reached in the pre versus post approximate symmetry of the effect as well.

Using orthodox quantum mechanics (QM), I (Levin, 2020) justified the existence of the PSE through contemporary QM's ideas. I tested mathematically the commonsensical idea that an efficient real-time prediction of an unpredictable future sentiment is impossible and affirmed it. Then I discussed the difference between an "actual-past" and an "effective-past" (Stapp, 2017) in QM, verbally suggesting that the PSE is merely a "quantum delusion." That is, it really appears, yet retrospectively only. Stapp (2014) had described a similar concept.

I (Levin, 2023) went further and mathematically explained the way in which this effect retrospectively appears in quantum theory. I relied on the "decoherent histories theory" (Gell-Mann & Hartle, 1989) and the contentious claim of the Orthodox Interpretation of QM (OIQM) that the reduction of the quantum state (sometimes called 'the wavefunction's collapse') occurs at the moment an agent's mind perceives the observation. Hence, although unobserved prestimulus records are decohered they retain their tentative nature (i.e., remain coexisting possibilities) until the moment the participant's mind consciously perceives the stimulus.

Concerning this "collapse" issue, it is interesting to note that this OIQM's assumption recently got an empirical support from psychological experiments. Lucido (2023) used true random number generators and an experimenter's early conscious observation of the coexisting possibilities for subliminal stimulus to reduce these possibilities to a definite stimulus, in the process reproducing the empirically well-established subliminal priming effect. After confirming that a usual subliminal priming effect had indeed appeared, he skipped the experimenter's early conscious observation of the coexisting possibilities for subliminal stimulus and repeated the test. He discovered that the subliminal priming effect disappeared. He (p. 193) concluded, therefore, that his findings support the OIQM's interpretation: "The outcome suggests that the act of conscious observation may play a critical role in quantum mechanics, and, by extension, physical reality." He successfully replicated this conclusion (Lucido, 2024, 2025).

Assuming that whether an emotionally significant experience would occur can be considered a "Yes" or "No" question posed to nature, I (Levin, 2023) assumed that the initial state of this qubit of information represents total ignorance and then used the formula to calculate from this initial ignorance state's density matrix (Schiff, 1968, pp. 379-380) the probability of a history composed of a sequence of decoherent alternatives and the usual rules of the classical probability theory to calculate the conditional probabilities to get "Yes" or "No" records at any prestimulus moment given any poststimulus record.

Throughout these calculations I used the most general 2 X 2 time evolution matrix. (In the current paper I continue to use the notations of Levin, 2023). I then used these conditional probabilities to calculate the retrospective difference between the "sentiment" (i.e., α_1) average (denoted by $< \ >$) at a prestimulus moment (i.e., at t_1) due to an emotionally *significant* stimulus (i.e., a stimulus that generates the $\alpha_2=1$ post stimulus sentiment) at t_2 (i.e., $<\alpha_1(t_1) \mid \alpha_2(t_2)=1>$, where the vertical bar (i.e., the | symbol) stands for the conditioned on phrase) on the one hand, and the "sentiment" (i.e., α_1) average at the same prestimulus t_1 moment due to an emotionally *insignificant* stimulus (i.e., that generates an $\alpha_2=-1$ post stimulus sentiment) at t_2 (i.e., $<\alpha_1(t_1) \mid \alpha_2(t_2)=-1>$) on the other hand. That is, the PSE, as (p. 184)

$$\langle \alpha_1(t_1) \mid \alpha_2(t_2)=1\rangle - \langle \alpha_1(t_1) \mid \alpha_2(t_2)=-1\rangle = 2 - 4\,(1-n_3^2)\,\sin^2[\omega\,(t_2 - t_1)], \qquad \text{Eq. 1}$$

with an angular frequency ω and some parameter n_3 whose square cannot surpass one (i.e., $n_3^2 \leq 1$). Notice that the subscript 3 in n_3 stands for the fact that this parameter can be interpreted as a third component of a unit vector $\hat{\mathbf{u}} = (n_1, n_2, n_3)$ that scalarly multiplies a vector of Pauli matrices (Schiff, 1968, p. 206) $\boldsymbol{\sigma} = (\boldsymbol{\sigma}_1, \boldsymbol{\sigma}_2, \boldsymbol{\sigma}_3)$ in the unitary time evolution matrix. Notice also that the two other components n_1 and n_2 were eliminated from the result on the right hand side of Eq. 1 in favor of $(1- n_3^2)$ using the facts that as components of a unit vector their sum of squares obeys $n_1^2 + n_2^2 = 1 - n_3^2$ and their only appearance in the result is as a sum of their squares. I (Levin, 2023) argued, therefore, that the success of the OIQM to explain the surprising yet statistically well-established empirical existence of the PSE is clear evidence that this interpretation with its emphasis on mind and consciousness to solve the notorious measurement problem is the correct interpretation of QM.

The values of n_3^2 and ω appeared free in my (Levin, 2023) general mathematical model and as a matter of principle they are theoretically indeed free. So, I noted it and (as an example) exploited this freedom to naively get a rough fit to some specific available presentiment curve. In passing, I pointed out that with $n_3^2 \neq 1$ and $\omega \neq 0$ (and unless suppressed by some other factor) the PSE would constantly fluctuate for all $t_1 < t_2$. Wondering about this conclusion, I tentatively proposed to associate this result with the relatively long (1 minute) duration that Alvarez (2016) had found in his planarian worms' behavior experiment and called for more longer data. Moreover, nowadays one can try to associate this result with the Radin (2023)'s analyzed 13 years of daily Twitter sentiment test. Indeed, two weeks is a very surprising long period. However, one must remember that these experiments are peculiar in their participants and their designs, Therefore, most probably their interpretation requires special caution. The purpose of the current article is to justify an $n_3^2 \approx 1$ value for the more regular presentiment tests' designs and to discuss the implications of such a value.

The Data's Interpretational Implications of an $n_3^2 \approx 1$ Value

Note that with an $n_3^2 \approx 1$ value in Eq. 1 one gets

$$\langle \alpha_1(t_1) \mid \alpha_2(t_2)=1\rangle - \langle \alpha_1(t_1) \mid \alpha_2(t_2)=-1\rangle \approx 2.$$

That is, the fluctuating term vanishes and the PSE should naively appear as a constant for all $t_1 < t_2$. Moreover, this constant PSE almost exactly mirrors the post stimuli difference between the sentiments (i.e., $\Delta[\alpha_2(t_2)] = 1 - (-1) = 2$). At first sight these results seem to contradict the known empirical facts that the presentiment difference is much smaller than the sentiment difference and has a short duration. However, this hasty observation is misleading. Whereas my calculation (Levin, 2023) is being carried out in a theoretical idealized model of just one qubit of information, the empirical PSEs are measured in complicated mundane experiments. One must take into account that the physiological arousals in which the PSE is detected, such as skin conductance, have poor resolution regarding the identification of the influential sentiment. The arousals measured by such methods at any moment are apparently a combined weighted response to several sentiments, sometimes temporally shifted relative to one another and even conflicting. Therefore, usually one should not expect that just a single sentiment would determine the EDA signal over a long period. Over time, other sentiments may usually contribute their influence to modify the effective (say skin conductance) signal. From the post stimulus signals we know that a sentiment is a slippery thing. Usually, it endures for several seconds at most. Therefore, it is nothing but reasonable to blame some queued previous sentiments for total masking of the presentiment long before the stimulus presentation and for partial masking of the presentiment shortly before the stimulus presentation. In addition, as I postulated (Levin, 2023) there is apparently poststimulus gain buildup that results probably by the nervous positive feedback systems while consciously contemplating the stimulus content. Looked in this way, neither the empirical time asymmetry of the presentiment difference's size with respect to the poststimulus difference's size nor the finite duration of the recorded PSE should surprise us.

Moreover, the insight that "originally" the presentiment difference mirrors the post stimulus difference between sentiments has a benefit. (By originally in the previous sentence I actually refer a mere hypothetical situation. That is, a situation with no (practically existing) other, previous, sentiments masking, and without the post-stimulus gain increase that most probably results in the nervous feedback systems while consciously comprehending the (say 'wild') stimulus content.).Whereas $n_3^2 < 0.5$ values, by the fluctuation they generate, may sometimes flip the direction of the PSE, a value of $n_3^2 \approx 1$ cannot do it. This can explain the aforementioned observation that usually the direction of the PSE resembles the direction of the poststimulus sentiment.

A Motivation for an $n_3^2 \approx 1$ Value from a Non-Ignorant Case

In order to describe an idealized typical presentiment test, my (Levin, 2023) calculation assumed the initial state (at t_0) to be a state of ignorance. That is, a 2X2 diagonal $\boldsymbol{\rho}$ ('density') matrix with two values of 0.5 along its diagonal. Such a density matrix describes a mixed state in which although it is known that the stimulus would be either "wild" or "mild," there is initially ignorance concerning which stimulus will eventually appear. With such an initial state the probability to get a value of 1 at t_1 is $p[1(t_1)] = \mathrm{Tr}[\rho\, P^1_1(t_1)] = 0.5$ (where Tr[] stands for the trace operation, that is the sum of diagonal elements, and $P^1_1(t_1)$ is the Heisenberg's projection operator onto the $|1\rangle\langle 1|$ ray at the t_1 moment) and likewise the probability to get a value of (-1) at time t_1 is $p[-1(t_1)] = 0.5$. These probabilities are forced by the unitarity of the time evolution operator $U(t_1, t_0)$ and *hold no matter what is the value of* n_3^2. On average, one predicts therefore at t_1 null net effect (i.e., $\langle \alpha_1(t_1) \rangle = 0$) and as shown in Levin (2023) if a stimulus is presented for the first time at $t_2 > t_1$ an appropriately correlated (n_3^2 dependent) PSE appears at t_1 as well.

Consider, however, the situation after a stimulus was presented at t_2. The participant is not ignorant any more. Suppose, for example, that an emotionally significant stimulus was consciously observed. This observation was accompanied with a corresponding change in the density matrix. The only element of this new density matrix (call it $\boldsymbol{\rho}_1(t_2)$, where the 1 subscript denotes the 'wild' sentiment) which differs from null is the $[\boldsymbol{\rho}_1(t_2)]_{1,1} = 1$ element.

The predicted probability to get a "wild" sentiment at some later moment $t_3 > t_2$ can easily be calculated as

$$p[1(t_3)] = \mathrm{Tr}[\rho_1(t_2)\ P^3_1(t_3)] = |[U(t_3, t_2)]_{1,1}|^2 = 1 - (1 - n_3^2)\sin^2[\omega\,(t_3 - t_2)]. \qquad \text{Eq. 2}$$

The probability to get a "mild" sentiment at t_3 completes $p[1(t_3)]$ to 1. Hence it is $(1 - n_3^2)\sin^2[\omega\,(t_3 - t_2)]$. Therefore, on the average one expects at t_3

$$\langle \alpha_3(t_3) \rangle = (+1)\ p[1(t_3)] + (-1)\ p[-1(t_3)] = 1 - 2\,(1 - n_3^2)\sin^2[\omega\,(t_3 - t_2)]. \qquad \text{Eq. 3}$$

That is, unless $n_3^2 = 1$ and assuming $\omega \neq 0$, the average at t_3 would change over time. Such a change over time seems to contradict our daily experience that a second exposure to a stimulus largely repeats the first sentiment we had at the first exposure to the same stimulus. Of course, this is not an exact contradiction statement. Moreover, our sentiments to a wild stimulus tend to calm down as more exposures to the same single stimulus are being accumulated and we habituate to it. An n_3^2 value close to 1 (i.e., $n_3^2 \approx 1$) seems appropriate to describe these daily experiences. Its closeness to 1 would prevent too wild repeated sentiments fluctuations whereas its small deviation from 1 would leave some flexibility to enable description of the sentiment change as repeated exposures to the same single stimulus are being accumulated.

Notice that if it is the emotional type of the stimulus by itself (i.e., its very objective sentimental valence grade) that really matters rather than the participant's actual emotional sentiment (in a subjective sense, due to the stimulus) that matters, an exact $n_3^2 = 1$ may be appropriate. In such a case one conceptually separates the participant's effective habituation (which can be attributed to that particular participant's nervous system adaptive state, that is, to the mind's substrate) from the (ontological) emotional type of the stimulus by itself, which can remain strictly constant over time, as is indeed the case if the stimulus is an enduring image. Metaphorically speaking, such an approach considers an ontological tendency (a propensity) as the analogue of a photon and the perceiving mind as an optical receiver. Mainstream physics regards the photon as an ontological quantum of certain potentialities (i.e., the electric potential and the magnetic vector potential) arranged as a 4-vector (Jackson, 1975, p. 549). The photon is assigned an ontological existence and is associated (within the QM's uncertainty constrains) with some direction of motion, frequency, angular momentum, and polarization. An optical receiver is a separate unit, ontologically distinguished from the incoming photon. If it detected the photon it is supposed to produce a notice of the detection, and consequently may generate various effects (say, musical tones). The receiver's reaction may be adaptively attenuated (say, by a built-in loop of automatic gain control). Due to this adaptation, similarly detected photons can generate varying loudness of the outcoming musical tones. This is a sort of habituation.

Implications of an $n_3^2 \neq 1$ Value on a True (i.e., Quantum) Uncertainty

The aforementioned initial density matrix represents a state of *ignorance*. In the QM's classification of states, a state of ignorance is sorted as a *mixed* state. That is, the participant cannot efficiently predict the stimulus type just because s/he does not know everything it is possible in principle to know about the case. The information about which stimulus type will appear is in principle available, yet it is not known to the participant until the stimulus appears. According to the partial information the participant has, it may come out either wild (denoted as (+1)) or mild (denoted as (-1)) with equal probabilities. As was explained before this participant's ignorance enforces at $t_1 > t_0$ a null average (i.e., $\langle \alpha_1(t_1) \rangle = 0$) by the *unitarity* of the time evolution operator $U(t_1, t_0)$, no matter what is the value of n_3^2. Mathematically (Schiff, 1968, p. 380), this mixed nature is expressed by the fact that $Tr[(\rho(t_0))^2] = 0.5^2 + 0.5^2 = 0.5 < 1$.

In principle, QM permits an initial purer state. That is, a prepared *pure* superposition state (PSS) with $\mathrm{Tr}[(\rho^{PSS}(t_0))^2] = 1$. In such a prepared initial PSS, participants know whatever can be known about the initial state, yet they cannot efficiently predict what stimulus type will appear due to an inherent *genuine* quantum uncertainty. Such a prepared initial PSS represents a superposition of *ontological tendencies* (propensities) for wild and mild stimuli. In a quantum superposition, both contradicting tendencies *coexist* as mere tendencies. An example density matrix of such a prepared state (i.e., $\boldsymbol{\rho}^{\mathbf{PSS}}(t_0)$) is given by a 2X2 matrix whose four elements are 0.5 each. Since according to QM the probability to get a value of (+1) in a state described by the density operator ρ at time t_1 is $p[1(t_1)] = \mathrm{Tr}[\rho\ P^1_1(t_1)]$ (where $P^1_1(t_1)$ denotes the projection operator at time t_1 in the 2X2 Hilbert space onto the $|+1\rangle\langle+1|$ ray in that space, that in matrixial notation is represented in the 2X2 Hilbert space by a 2X2 diagonal matrix $\mathbf{P^1}_{\mathbf{1}}(t_1)$ with values of 1 and 0 along the diagonal) the probabilities of seeing a wild image in this state is $p[1(t_1)] = \mathrm{Tr}[\boldsymbol{\rho}^{\mathbf{PSS}}\ \mathbf{P^1}_{\mathbf{1}}(t_1)] = 0.5$, and similarly the probability of seeing a mild image in this state is 0.5.

One way to prepare such an initial PSS is by passing half spins (say silver atoms) through a Stern-Gerlach (SG) apparatus (Gerlach & Stern, 1922). (Other methods to generate “true random numbers” exist but the advantage of this implementation of a SG apparatus is that it clearly ends up with the definite desired PSS density state.) It is known that the not homogeneous magnetic field generated by the magnets of this apparatus will separate the entering beam into two sub beams according to their spin direction relative to the direction of the magnetic field. Let us call this direction x. So, the atoms in one sub beam have positive spin relative to the x direction and the atoms in the second sub beam have negative spin relative to the x direction. Suppose that the atoms in the first sub beam are *not* detected at the exit of this first SG apparatus. Rather, these atoms are then entering (at t_0) another SG apparatus. The magnets of this second SG apparatus are oriented perpendicular to those of the first SG apparatus. Let us call this second direction the z direction. This second SG apparatus splits its entering sub beam into two sub-sub beams. The atoms in these sub-sub beams are then detected by two detectors. That is, one sub-sub beam will be detected by a detector that collects the positive spins relative to the z direction and the other sub-sub beam will be detected by a detector that collects the negative spins relative to the z direction. If the detector that collects the positive spins relative to the z direction (i.e., those described by the ray $|+1_z\rangle\langle+1_z| = (1, 0)^T\ (1, 0)$ where the T denotes a transposition) detected a silver atom a wild stimulus is presented to the participant. If the detector that collects the negative spins relative to the z direction (i.e., those represented by the ray $|-1_z\rangle\langle-1_z| = (0, 1)^T\ (0, 1)$) detected a silver atom a mild stimulus is presented to the participant.

The (spin) state of the silver atoms exiting the first SG apparatus in the sub beam with positive spin relative to the x direction is given (in a standard Hilbert spin space spanned by the eigenvectors of $\boldsymbol{\sigma}_z$) by $|+1_x\rangle\langle+1_x| = (1/\surd 2, 1/\surd 2)^T\ (1/\surd 2, 1/\surd 2)$. This is the 2X2 aforementioned matrix whose four elements are 0.5 each (i.e., $\boldsymbol{\rho}^{PSS}(t_0)$).

In the lack of any asymmetry between the tendencies of this prepared initial PSS it is expected that future sentiments (i.e., $\alpha_1(t_1)$) would average to null at any t_1 as well. However, calculating $\langle\alpha_1(t_1)\rangle$ along the calculation lines in Levin (2023) with this initial $\boldsymbol{\rho}^{PSS}(t_0)$ replacing Levin (2023)'s $\boldsymbol{\rho}(t_0)$ one easily gets

$$\langle\alpha_1(t_1)\rangle = 2\ \{n_1 n_3 \sin[\omega\ (t_1 - t_0)] - n_2 \cos[\omega\ (t_1 - t_0)]\} \sin[\omega\ (t_1 - t_0)]. \qquad \text{Eq. 4}$$

Since $n_1^2 + n_2^2 + n_3^2 = 1$ by the fact that n_1, n_2 and n_3 are components of a unit vector, if $n_3^2 = 1$ then n_1 and n_2 must each be a null. In such a case one gets from this formula the expected average; $\langle\alpha_1(t_1)\rangle = 0$ at $t_1 > t_0$. (If, however, $n_3^2 < 1$ neither n_1 nor n_2 must be a null and assuming $\omega \neq 0$ the $\langle\alpha_1(t_1)\rangle$ average would fluctuate as t_1 changes.) The $\langle\alpha_1(t_1)\rangle$ average is a measurable quantity. So, starting with this prepared $\boldsymbol{\rho}^{PSS}(t_0)$ one can be sure that indeed $n_3^2 = 1$.

Needless to say, according to OIQM the PSE is a retrospective result of the quantum reduction of the state accompanying the conscious observation. Hence it should appear with the PSS as well. In a series of tests in which a so chosen stimulus is presented to a participant $t_2 - t_0$ after that test`s t_0, it is easy to predict that starting with a PSS (since $n_3^2 = 1$) one should get from the idealized mathematical model $\langle\alpha_1(t_1) \mid \alpha_2(t_2)=1\rangle - \langle\alpha_1(t_1) \mid \alpha_2(t_2)=-1\rangle = 2$. That is, ideally one can expect a time symmetrical PSE. This clear theoretical prediction can be empirically checked. If, as I tend to believe, it would come wrong (that is, the usual short duration small PSE, rather than a longer duration PSE with comparable size to the post stimulus sentiment, would still be seen) it would indicate that the method`s aforementioned poor discrimination ability between sentiments and the awakened positive feedback nervous loops after a stimulus presentation are responsible for the asymmetry of the PSE. If this would be the conclusion from the PSS case one can argue that this interpretation should apply in the ignorance (mixed state) case as well.

Conclusions

It seems that my (Levin, 2023)'s rough fit to some specific available presentiment curve was naïve and my theoretical model is an idealized and a very general one.

Therefore, application of this model to mundane experiments should be done more carefully and to take the limitations of the measurement method into account.

There seem to be good reasons to believe that in regular tests of PSE a value of $n_3^2 = 1$ (or at least $n_3^2 \approx 1$) holds. In principle, this can be verified empirically in experiments that are prepared to start with a PSS. It appears (at least approximately) a commonsensical value for reproducing daily experiences in repeated exposures to a stimulus. Reduction of a significant emotional sentiment under repeated exposures to a stimulus can be attributed to an adaptive feature of the mind's substrate (i.e., the nervous system).

With $n_3^2 = 1$ the theoretical (i.e., the idealized 'original') presentiment exactly mirrors the post stimulus sentiment. Such a symmetry (albeit to a lesser degree and a rough one) can frequently be identified in the empirical data. The exact theoretical symmetry apparently deteriorates if the poor discrimination ability of the method (such as EDA) from other, probably prevailing, previous, partially, or fully overlapping sentiments, shortly before the stimulus presentation and the mind-substrate's (i.e., nervous system's) positive feedback loops operation after the stimulus presentation are being taken into account. Hypothetical prevailing previous sentiments queued before the stimulus presentation most probably explain the finite duration of the PSE by masking it as well. It is proposed that studying the PSE in prepared PSS cases would help to show it by exploiting their unambiguous $n_3^2 = 1$ value.

With $n_3^2 = 1$ the value of ω does not matter for describing the PSE. The reason is the altogether vanishing of the fluctuating terms' amplitudes in the relevant expressions.

This does not preclude other n_3^2 values under peculiar tests' designs and peculiar participants. Unless being suppressed by other sentiments, such cases may apparently generate long duration considerable PSE correlations. Theoretically, sometimes they may exhibit fluctuating PSE correlations as well.

Declaration of interests: The author declares that there is no conflict of interest.

References

Alvarez, F. (2016). An experiment on precognition with planarian worms. *Journal of Scientific Exploration, 30,* 217-226.

Bierman, D. J. (2006). Empirical research on the radical subjective solution of the measurement problem. Does time get its direction through conscious observation? *American Institute of Physics (AIP) Conference Proceedings, 863*(1) 238-259. https://doi.org/10.1063/1.2388757

Bierman, D. J. (2008). Consciousness induced restoration of time symmetry (CIRTS): A psychophysical theoretical perspective. In *Proceedings of the 51st Parapsychological Association annual meeting* (pp. 33-49). Parapsychological Association.

Duggan, M., & Tressoldi, P. E. (2018). Predictive physiological anticipatory activity preceding seemingly unpredictable stimulus: An update of Mossbridge et al's meta-analysis. *F1000Research*, 7, 407. https://doi.org/10.12688/f1000research.14330.2

Gell-Mann, M., & Hartle J. B. (1989). Quantum mechanics in the light of quantum cosmology. *Proceedings of the 3rd International Symposium on The Foundations of Quantum Mechanics in the Light of New Technology, Tokyo, Japan* (pp. 347-369). https://doi.org/10.1142/9789812819895_0036

Gerlach, W., & Stern, O. (1922). Der experimentelle Nachweis der Richtungsquantelung im Magnetfeld (The experimental proof of directional quantization in a magnetic field). *Zeitschrift für Physik, 9*(1), 349–352. https://doi.org/10.1007/BF01326983

Jackson, J. D. (1975). *Classical electrodynamics*. (2nd ed.) John Wiley & Sons.

Levin, E. Y. (2020). The presentiment effect as a quantum delusion. *Psychology of Consciousness: Theory, Research, and Practice, 7*(2), 189–205. https://doi.org/10.1037/cns0000207

Levin, E. Y. (2023). The presentiment effect points to an occurrence of a von Neumann's collapse. *Journal of Anomalous Experience and Cognition, 3*(1), 174-193. https://doi.org/10.31156/jaex.24455

Lucido, R. J. (2023). Testing the consciousness causing collapse interpretation of quantum mechanics using subliminal primes derived from random fluctuations in radioactive decay. *Journal of Consciousness Exploration & Research, 14*(3), 185-194. https://doi.org/10.13140/RG.2.2.20344.72969

Lucido, R. J. (2024). Replication of results from a test of the consciousness causes collapse interpretation of quantum mechanics using subliminal priming methodology. *Journal of Consciousness Exploration & Research 15*(3), 229-239. https://jcer.com/index.php/jcj/article/view/1111/0

Lucido, R. J. (2025). Do cats collapse the wave function? confronting the measurement problem with subliminal priming. *Journal of NeuroPhilosophy 4*(1). https://doi.org/10.5281/zenodo.15003998

Mossbridge, J. A., & Radin, D. (2018). Precognition as a form of prospection: A review of the evidence. *Psychology of Consciousness: Theory, Research, and Practice 5*, 78-93. https://doi.org/10.1037/cns0000121

Murphy, S. T., & Zajonc, R. B. (1993). Affect, cognition, and awareness: affective priming with optimal and suboptimal stimulus exposures. *Journal of Personality and Social Psychology 64*(5), 723-739. https://doi.org/10.1037/0022-3514.64.5.723

Radin, D. (2016). Presentiment. In *Psi encyclopedia*. The Society for Psychical Research. From https://psi-encyclopedia.spr.ac.uk/articles/presentiment.

Radin, D. (2023). Sentiment and presentiment in Twitter: Do trends in collective mood “feel the future”? *World Futures, 79*(5), 525-535. https://doi.org/10.1080/02604027.2023.2216629

Schiff, L. I. (1968). *Quantum mechanics* (3rd ed.), McGraw-Hill Book Company.

Stapp, H. P. (2014). Quantum physics and philosophy of mind. In A. Corradini, and U. Meixner (Eds.) *Quantum physics meets the philosophy of mind* (pp. 5-16). Walter de Gruyter GmbH.

Stapp, H. P. (2017). Retrocausation in quantum mechanics and the effects of minds on the creation of physical reality. *AIP Conference Proceedings* 1841, 040001. https://doi.org/10.1063/1.4982777