

RESEARCH ARTICLE

**Coincidence or Psi?
The Epistemic Import of Spontaneous Cases
of Purported Psi Identified Post-Verification**

SHARON HEWITT RAWLETTE

sharon.rawlette@gmail.com

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Abstract—Many people are persuaded of the existence of psychic phenomena by their own spontaneous experiences of apparent psi. However, without some measure of how often psi-suggestive experiences can be expected to occur purely by chance, it is difficult to determine the epistemic import of these cases. While methods have been developed to find statistical baselines for some spontaneous cases—specifically ones in which cases of interest can be identified before any verification of their supposedly psychic content has been obtained—many spontaneous cases of purported psi are not identified as such until after some degree of spontaneous verification occurs, for instance, when a person notices a striking correspondence between their mental state and another event to which that state appears to have no physical causal connection. This paper develops a method applicable to these cases—the time-slice method for calculating baseline correspondence potential—and thus enables individuals to determine the epistemic import of their own spontaneous psi experiences.

Introduction

Personal experience of apparently psychic phenomena is one of the most important reasons individuals cite for their belief that psychic phenomena exist (Wagner & Monnet 1979),¹ and parapsychologists have long pointed out that psi phenomena spontaneously encountered outside the laboratory are much more striking than those encountered under controlled experimental conditions (Stevenson 1968, Braude 1986, 2007, Radin 2013). Skeptics of psychic phenomena often dismiss the import of these spontaneous cases, however. In addition to citing the possibility of deceit or faulty memory, they argue that these cases lack evidential force because there is no statistical

baseline against which to measure the frequency of such events. Given the huge number of events constantly occurring, it is entirely plausible, argue the skeptics, that spontaneous psi-suggestive experiences may be nothing more than coincidences, brought to us courtesy of the Law of Truly Large Numbers (Diaconis & Mosteller 1989).

As Ian Stevenson (1968) has rightly pointed out, some cases of spontaneous psi are so blatantly paranormal that chance is not a remotely plausible explanation for them. He writes,

We can too easily forget . . . that we only need statistical methods of assessment in situations where chance is a likely alternative explanation and when we wish a method of identifying the probabilities that chance is not the correct explanation. (Stevenson 1968:92)

Nevertheless, many of the personal experiences that convince people of the existence of psi are of exactly this less blatantly paranormal type, and it would be advantageous to have a method for determining the likelihood that they are truly cases of psi rather than mere coincidences.

Parapsychologists have already developed such methods for some spontaneous psychic experiences. For instance, Andrew Paquette (2012a,b, 2015) has developed a method for using his extensive personal dream journal as a source of statistical baselines against which to measure the epistemic import of his psychic dreams. This method works because the entries in his journal were recorded before it was determined whether the dreams therein described could be verified by correspondence with external events. Similar methods presumably could be found for other spontaneous cases of psi that are identified as cases of interest before any verification of their psychic content has been obtained.

However, many spontaneous experiences of purported psi are not recognized as such until *after* some degree of spontaneous verification has occurred. That is, a person doesn't suspect that anything psychic is going on until after they notice a striking correspondence between two events that don't appear to have any physical causal connection. I suspect that these cases identified post-verification make up the majority of the cases that convince ordinary people (i.e. people without pronounced psychic ability) of the reality of psychic causation. It's for this reason that I think it important to develop a method for calculating a statistical baseline that works in such cases.

In this paper, I develop such a method, tailored particularly to cases in which the noted correspondence is between a person's mental state and some other event. In the Introduction, I review some preliminary

epistemological considerations regarding what reason, if any, observing a particular correspondence between a person's mental state and another event presumed to be unconnected to it by physical causation gives us for believing that the correspondence is a product of psychic causation. In particular, I discuss how to take into account multiple endpoints as well as how one might determine a rational prior degree of belief in psychic causation. In the next main section of the paper, "**The Problem of Baseline Correspondence Potential**," I illustrate the difficulty of finding a statistical baseline for the correspondence in question: specifically, of determining how often one would encounter a correspondence of this degree purely by chance. In the next main section, I propose the time-slice method for calculating baseline correspondence potential, and then in the section titled "**Applying the Method**," I demonstrate the application of the time-slice method to two real-life cases, while refining it in two important ways. In the final section of the paper, I issue a caveat and highlight an important further application of the method.

Definition of Psychic Causation

Before we get into the meat of the subject, let me say a few words about my use of the term 'psychic causation'. For convenience, I use the term 'psychic causation' to refer broadly to any manner in which a mental state—a desire, belief, thought, etc.—may be explanatorily connected to another mental or non-mental event² in a fashion that defies what C. D. Broad (1962:3) has called the "basic limiting principles" of the modern, physicalist worldview. Note that this definition allows under the umbrella of psychic causation even the "acausal connecting principle" hypothesized by C. G. Jung (2010) and for which he introduced the now widely employed term 'synchronicity'. The method I describe in this paper can be used to investigate the evidence for an acausal connecting principle as well as the evidence for psychic causation more strictly understood.

Note that my definition of psychic causation also encompasses cases of indirect causation, where, for example, a mental state may explain the occurrence of a particular physical event only by way of some intermediate event, like the action of a divine being. Furthermore, this definition says nothing about the *direction* of explanation. In discussing the possibility of psychic causation, I intend to leave open whether the psychic causation in any particular case originates with one of the two corresponding events, whether it originates with some third event that explains them both, and even whether it makes any sense at all to talk in terms of direction of explanation rather than some holistic organizing principle. In my discussion of the scarab coincidence below, I do refer to the "influence" of a mental

state on other events, but I do this only for convenience of exposition, and I hope that it will be clear to the reader that a similar argument could be made if the influence were hypothesized to run in the opposite direction, to extend to both the mental state and the other events from some common cause, or to be holistic.

Probability on Competing Hypotheses

One of the first things many of us do when we observe an event that bears uncanny resemblance to some presumably causally unrelated aspect of our mental state is to think to ourselves, “What are the odds?” If the causal history of the event is fairly straightforward, we may be able to come up with an estimate of the probability that event E would be observed by subject S at time T given a set of pre-existing circumstances C that excludes any causal connection between E and S’s mental state. Let’s say that we determine that this probability is 1 in 279,936. That might seem pretty significant, but in fact very improbable events happen all the time. If I roll a fair, six-sided die seven times, there are 279,936 possible outcomes. *Whichever* of these outcomes occurs, it had only 1 chance in 279,936 of doing so. Let’s say I rolled 5-2-5-4-6-3-1. Would I think that because of the low odds of this outcome some psychic process must be at work? Probably not. However, one reason I might think this outcome provided evidence for psychic causation is if this sequence of numbers was *personally significant* to me, that is, if it corresponded in some significant way with my mental state. This might be the case if, for instance, I’d been recently wondering if I should call my friend Debbie and this was Debbie’s phone number. In that case, an outcome that is very improbable on the hypothesis of chance is much *more* probable on the hypothesis of some explanatory connection to my mental state. To take one example of such a hypothesis, if my mental state were somehow influencing the outcome of the die rolls (either directly or perhaps through the intervention of some non-physical being who desired to give me an answer to my question), this is precisely the sort of outcome we would expect.

We can summarize the point this way: An event E provides evidence for the existence of a psychic link to the degree that E is more probable on the hypothesis of a psychic link than on the hypothesis of no psychic link. Let’s define our psychic link hypothesis as follows.

Psychic Link (PL): There exists a relationship of psychic causation between event E and the mental state of S.

Using conditional probability notation, according to which $P(x|y)$ symbolizes the probability of x given y , we can now succinctly state that E provides evidence for PL to the degree that $P(E|PL) > P(E|\neg PL)$. The ratio

$$\frac{P(E | PL)}{P(E | \neg PL)}$$

is called the “Bayes factor” for PL over $\neg PL$.

Multiple Endpoints and the Definition of Personal Significance

In the case in which I roll my friend Debbie’s phone number, you might think that $P(E|\neg PL) = 1/279,936$, or 0.00000357 , and $P(E|PL)$ is close to 1, making the Bayes factor for PL over $\neg PL$ close to $279,936$ and meaning that this piece of evidence counts $279,936$ times more in favor of PL than $\neg PL$. However, this approach ignores, among other things, what statisticians Persi Diaconis and Frederick Mosteller (1989:859–860) call “multiple endpoints”: other rolls that could have occurred and been at least as personally significant to me as the one that did occur.

Let’s define an event E ’s personal significance for a subject S as the degree of correspondence between E and S ’s overall mental state, where our measure of correspondence gives greater weight to more salient components of a mental state—for instance, components of higher emotion or more enduring character—and to larger and/or more enduring components of a physical event. I won’t develop here a more detailed definition of personal significance, or of what exactly I mean by “correspondence” between E and S ’s mental state, but I suspect that such a definition could be usefully fleshed out using Kolmogorov complexity, where the complexity of a state is equal to the size of its shortest description. If we notate the complexity of X as $C(X)$, we could then define the correspondence between a mental state and another event as:

$$\frac{C(\text{mental state}) + C(\text{event})}{C(\text{mental state} + \text{event})}$$

But this definition is not essential to what follows, so readers who don’t find it helpful may simply rely on their own intuitive notion of such correspondence.

Returning to the case at hand, consider that, instead of Debbie’s phone number, I might have rolled my *own* phone number, or that of a dear

deceased relative. I might have rolled the first seven digits of my social security number. Or the first four digits of the roll might have corresponded to the address of a home I'm considering purchasing. Once the roll has occurred, it's easy to forget all the other ways it might have been personally significant. But what's important in determining the likelihood of psychic causation in such a case is not just how likely it was that I would roll by chance the particular personally significant number I did roll, but how likely it was that I would roll *some* number of at least comparable personal significance to the one I did. And this is because $P(E|PL)$, which we previously cited as possibly close to 1, is actually going to get progressively smaller the more personally significant alternative rolls there are. Let's say, for instance, that once we consider my mental state at the time of rolling the dice and its relationship to all possible rolls at that time, it becomes clear that there were 15 rolls besides E that would have been at least as personally significant for S. If each of these 16 rolls is equiprobable on PL, this means that, on the hypothesis of PL, the probability of getting the roll I did is not 1 or even close to 1 but at the very most is $1/16$ or 0.0625. If $P(E|PL) = 0.0625$ and $P(E|\neg PL) = 0.00000357$, then the Bayes factor for PL over $\neg PL$ is now only 17,507.

Because of the importance of multiple endpoints, in this paper I will adopt a special notation— E' —to refer to the union of all events at least as personally significant to the subject in question as E.³ The phrase 'the probability of E' ' will thus refer to the probability that some event at least as personally significant as E occurs. Note that E' occurs whenever one of its member events occurs; so if E occurs, then E' also occurs. Also note that member events of E' do not have to be mutually exclusive as in the dice example just employed. I will discuss simultaneously occurring multiple endpoints in the section "**Applying the Method.**" The takeaway from the above discussion is that, in determining the epistemic import of E for belief in PL, we must consider *the combined probability of all events that could have occurred at time T that would have had at least E's level of personal significance for S.*

In fact, matters are a bit more complicated than this. I said in the case above that $P(E|PL)$ was *at the very most* $1/16$. In fact, it might be significantly less, if one of the following things is true.

- 1) One of the alternative rolls that is at least equally personally significant as the actual one is in fact quite a bit *more* personally significant than the actual one. If so, then the probability of that alternative roll on PL will be much higher than $1/16$, meaning that the remaining personally significant rolls, including E, will each have *lower* probabilities on PL, since the probabilities of all the alternatives on PL must sum to 1.

2) There are rolls *less* personally significant than the actual roll that collectively have a significant probability of occurring on PL. These alternatives will also reduce $P(E|PL)$, since, again, the probabilities of all alternatives on PL must sum to 1.

A precise calculation of $P(E|PL)$ would have to take all of these possibilities into account and determine what the relative probabilities of these different rolls would be on the hypothesis of PL. One thing we can do to simplify our calculations is to focus on the collective probability of E' on PL instead of the probability of E alone, and thus on the epistemic import of the occurrence of E' rather than on that of E specifically. That is the approach I will take in this paper. However, it still leaves the problem of determining just how likely E' is on PL. And it *is* a bit of a problem, because we can imagine many different strengths of psychic link that would make E' more or less probable. For instance, are we testing the hypothesis that there is a psychic link so strong that it would make $P(E'|PL)$ approach 1? Or are we testing a hypothesis on which the psychic link is much weaker, making $P(E'|PL)$ only 0.01 or 0.001? We can in fact test any of these hypotheses we like and see how much evidence the occurrence of E' provides for them, but it would be a good idea to make this aspect of the hypothesis explicit. We could do that by modifying our definition of PL as follows.

Psychic Link_x (PL_x): There exists a relationship of psychic causation between event E and the mental state of S such that $P(E'|PL) = x$.

If we modify PL thus, we make explicit the fact that the degree of support E provides for PL depends on how strong the psychic link in PL is assumed to be. The stronger the psychic link—i.e. the larger x is—the larger the Bayes factor for PL_x over $\neg PL_x$ will be. On the other hand, it seems likely that the larger x is, the lower the prior probability of PL_x will be. We will return to this thought at the end of the next subsection, after a more general discussion of the prior probability of PL.

Prior Probability of PL

According to the Bayesian approach, the size of the Bayes factor needed to justify belief in PL (of whatever strength we choose to consider) depends on the prior probability of PL. Bayes' theorem applied to our case gives us

$$\frac{P(PL | E)}{P(\neg PL | E)} = \frac{P(PL)}{P(\neg PL)} \cdot \frac{P(E | PL)}{P(E | \neg PL)}$$

Notice that the ratio all the way on the right is the Bayes factor. As we can see from this equation, if PL and \neg PL are equiprobable prior to our observation of E, then any degree to which E is more probable on PL than on \neg PL will mean we should accept PL. If \neg PL is twice as likely as PL before the observation of E, the observation has to be more than twice as likely on PL as on \neg PL (i.e. the Bayes factor has to be greater than 2) for us to be justified in accepting PL as a result. And if \neg PL is 100,000 times as likely as PL, then E has to be over 100,000 times more likely on PL than on \neg PL.

But what prior probabilities *should* these two hypotheses have? Many skeptics of psychic causation say that the prior probability of PL should be extremely low (regardless of the value of x). For instance, psychologists Eric-Jan Wagenmakers, Ruud Wetzels, Denny Borsboom, and Han L. J. van der Maas (Wagenmakers et al. 2011:428) claim it would be reasonable to assign PL a prior probability close to zero. For illustrative purposes, they choose the number 10^{-20} , or 0.00000000000000000001, which would mean that to justify belief in PL, we would need evidence with a Bayes factor for PL over \neg PL of more than 10^{20} , a bar that few everyday cases of psi can be expected to reach. However, all three of the arguments that Wagenmakers et al. offer for this conclusion are unsound. Let's briefly review them.

Wagenmakers et al. first cite the fact that “we have no clue about how precognition could arise in the brain” (p. 428). Their implicit assumption is that, if precognition were likely, we would already have some idea of how it works. In reality, of course, science is full of phenomena that we believe to exist even though we have no idea how they work. To take one particularly relevant example, all medical researchers are well aware that the placebo effect exists and must be controlled for, even though no one yet has a good handle on the mechanism behind it. If we had to know how something worked before we could admit its existence, science would have very few subjects for investigation.

Wagenmakers et al. also argue that if psychic phenomena were at all possible, natural selection would have already “led to a world filled with powerful psychics (i.e., people or animals with precognition, clairvoyance, psychokinesis)” (p. 428). Notice, however, that a parallel argument could be used to conclude that there are no humans with IQs over 100: “If IQs over 100 were possible, natural selection would have already given *all* humans and animals that level of intelligence. Since it hasn't, an IQ greater than 100 must not be possible.” Something is clearly wrong here.

Wagenmakers et al. have overlooked two important points in constructing this argument. First, any development of mental capacities—psychic or otherwise—comes at a cost. Living things have finite resources,

and natural selection will not develop to the highest degree every capacity that would be useful in survival but will instead select those creatures that have a particularly efficient *blend* of various capacities. We should expect to find, as we do, that some capacities are more well-developed in some species than in others, and that even within a species there is variation in the capacity to perform different tasks. Thus, if psychic causation exists, it would be in keeping with what we see in other human and animal capacities for human psychic ability to be unevenly developed. Second, if psychic abilities are much like other mental abilities, we should expect that they can be refined by practice, as well as that some conditions are more conducive to their optimal functioning than others.

Wagenmakers et al. offer as their final argument the observation that, if psychic abilities existed, the world's casinos would have long ago gone out of business. However, there is no requirement that psychic abilities, if they exist, must be under conscious control, nor that they must be readily activated by the desire for monetary gain.⁴ But even in the case that psychic abilities *could* be routinely employed by the general population for monetary gain, casino owners could also have psychic abilities, including perhaps the ability to block the precognition of clients or to influence the roulette wheel against their bets. In the end, all that a casino owner needs to do to be assured of profits is to set the house odds slightly greater than the average odds of clients who have an average level of psychic ability.

Given these problems with Wagenmakers et al.'s arguments for assigning PL a near-zero prior probability, let's consider some other ways of assigning it a prior. One way we might find a rational prior is by consulting experts. While the people most qualified to be called "experts" on ostensibly psychic phenomena are those who have rigorously studied the vast accumulation of data on the topic, so many people in this group have a strong belief in the reality of psychic causation that we might be accused of biasing our sample by consulting only people in this group. So let's look instead at the opinions of a cross-section of highly regarded American scientists.

A survey of 339 council members and section committee members of the American Association for the Advancement of Science showed that, while 50% of respondents considered extrasensory perception either a remote possibility or an impossibility, 29% considered it either an established fact or a likely possibility (McClenon 1982).⁵ If 29% of eminent scientists consider psychic causation either an established fact or a likely possibility, we can hardly justify assigning PL a prior close to zero. Even if 50% of scientists had said ESP was *completely* impossible, assigning it a probability of absolute zero, if we balance that against 29% who gave it a probability of at least 0.5, and the remaining 21% who we will say gave it

on average a probability of 0.25, then the overall weight of these experts' opinions gives us reason to assign the existence of ESP a prior probability of at least 19.8%. If we took the range of these experts' opinions as our prior probability for PL, we would need a Bayes factor of only slightly more than 5 to warrant believing PL.

Now it's important to note that the respondents to this survey were stating their degree of belief that ESP operates for *someone sometime*, not their belief that it is operating in any particular case we might be considering. PL is our hypothesis that there is psychic causation *in the case of the particular event E and the particular mental state we are considering*, and we would have to make a few more assumptions if we wanted to determine what the experts' opinions imply about what prior probability should be assigned to PL in whatever case we are considering (for instance, assumptions about whether psychic causation might be more likely to occur under certain conditions and less likely to do so under others). Nevertheless, the fact that 29% of American academic scientists surveyed considered ESP at least a "likely possibility" argues strongly against the idea that the prior probability of PL should be extremely low.

Another way to obtain a rational prior probability for PL is to look at the results of formal parapsychological experiments. As readers will likely be aware, several meta-analyses of these experiments show small but highly statistically significant effects suggestive of psychic causation. For instance, psychologists Charles Honorton and Diane Ferrari (1989) analyzed 309 forced-choice precognition experiments published in peer-reviewed journals over the preceding 52 years, experiments that collectively involved more than 50,000 people and nearly two million trials. The average effect was very small (0.020), but the odds of an effect that size occurring by chance across such an enormous sample they calculated to be 6.3×10^{-25} . A larger effect size of 0.21 was found in a meta-analysis of 26 presentiment experiments between 1978 and 2010, and chance odds were calculated to be between 5.7×10^{-8} and 2.7×10^{-12} , depending on whether it was assumed that the presentiment effect varied randomly between experiments (Mossbridge, Tressoldi, & Utts 2012). Similarly, a 2017 meta-analysis of 52 dream-ESP studies between 1966 and 2016 found an effect size of 0.18 with chance odds of 2.72×10^{-7} (Storm et al. 2017). These meta-analyses and others, including several focused on psychokinesis, are all discussed in Etzel Cardeña's 2018 comprehensive review of the evidence regarding parapsychology, where he concludes, "This overview of meta-analyses of various different research protocols supports the psi hypothesis" (Cardeña 2018:672).

Depending on the degree of similarity between the situations examined in these controlled experiments and the circumstances of the particular coincidence we're considering, these studies could give us reason to assign PL a prior probability not far from 1. But now we have to return to the question of what version of PL we are considering. Is it one in which the psychic link is so strong as to make $P(E'|PL)$ close to 1? Or is it one in which the psychic link is much weaker, making $P(E'|PL)$ closer to 0.01 or 0.001? The psychic effects observed in the controlled experiments described above are rather small (though comparable to those produced by more widely accepted psychological phenomena (Richard, Bond, & Stokes-Zoota 2003)), and this means that the version of PL for which they could support a prior probability nearing 1 is a version of PL that puts $P(E'|PL)$ on the smaller side. When we experience a really striking correspondence between our mental state and another event and consider that it may have a psychic cause, the psychic mechanism we have in mind is generally one much more powerful than what has thus far been observed in the laboratory. And for this hypothesis of a *strong* psychic link, where $P(E'|PL)$ is quite large, the laboratory experiments will give us some prior support but will not be able to give us a prior probability anywhere near 1. In fact, it seems that the farther the effect size gets from that supported by the laboratory experiments, the lower will be the prior probability of PL supported by those experiments. If we are interested in evidence for psychic causation with large-scale effects, that evidence is going to have to come largely from outside the laboratory.

Looking outside the laboratory, we find many accounts of blatantly paranormal psi that are quite credible when closely investigated. For some excellent examples, see the cases of physical mediumship described by Braude (1986). While it seems to me that the cumulative evidence offered by well-attested, well-controlled occurrences of blatantly paranormal psi gives us strong reason to assign the existence of psychic causation with large-scale effects a probability close to 1, once again that does not mean that we have reason to assign a high prior probability to the operation of psychic causation in the particular case we are considering. Nevertheless, all the data cited above should make it clear that the prior probability of the operation of psychic causation in the particular case we are considering cannot be nearly as low as contended by Wagenmakers et al., and thus the Bayes factor necessary to overcome a rational prior probability for PL is not going to have to be nearly as large as 10^{20} . This in turn means that the Bayes factor even of less blatantly paranormal cases of purported psi may be enough to tip the scales in favor of PL. At the very least, the Bayes factor of such cases is worth investigating.

The Problem of Baseline Correspondence Potential

As we have seen from the preceding discussion, determining the Bayes factor of a purported case of psi requires having, in addition to a value for $P(E'|PL)$, a value for $P(E'|\neg PL)$. However, calculating this latter value is not nearly as straightforward as many people assume. Let me illustrate the difficulty by returning to the die-rolling example.

Imagine that I tell you about my amazing experience in which I was wondering whether I should call my friend Debbie and then I rolled seven dice and they produced her phone number. You would probably think this was a pretty striking event. Perhaps so striking as to be good evidence for psychic causation. But consider whether your opinion would change if you knew that I had been rolling these seven dice once a minute for a year, each time wondering whether I should call Debbie.

Most people, given this additional information, would find it thoroughly unsurprising to hear that I had on one occasion seen the dice produce my friend's phone number. Most of us immediately realize the relevance of all the *other* times I rolled the dice without getting my friend's phone number. This is a demonstration of our intuitive sensitivity to what is often called the Law of Truly Large Numbers. While it's true that rolling my friend's number had only a 1 in 279,936 chance of happening at any *individual time*, it had an 84.7% chance of happening at least once during the whole year in which I was rolling my seven dice once per minute.⁶ Unless there's some reason to think that I was doing something relevantly different on that one occasion, there's no reason to be surprised about rolling my friend's phone number against the background of so many additional trials. Even things that are unlikely to happen if you try only once are very likely to happen sometime over many tries.

Now it might seem that if, in real life, I rolled the dice only one time while wondering whether I should call Debbie and on that single occasion got her phone number, this would make the problem go away, but this is not so. Determining $P(E'|\neg PL)$ is problematic even in cases where I don't repeat the same scenario over and over. To see why, follow me through a series of further hypothetical situations.

Let's go back to the case where I rolled the dice once a minute for a year. Now imagine that I wasn't thinking of Debbie's phone number each time I rolled the dice. Imagine instead that, each time I rolled my set of seven dice, I was thinking of a different seven-digit number. Does that make the fact that I got the number I was thinking of once in 525,600 tries more or less likely than before? In fact, it doesn't affect the odds at all. As long as the odds in each case remain exactly the same and the total number of trials

does as well, it doesn't affect the overall odds whether the number I have as my "target" is the same or different in each case.

Now imagine that, instead of rolling dice every time, I use many different random number generators over my 525,600 trials. Sometimes it's a little quantum gadget plugged into the USB drive of my laptop. Sometimes it's a random number generator I activate over the Internet. Sometimes it's a random number table. Again, as long as the odds remain the same across devices, this doesn't change the probability of the outcome.

Next imagine that sometimes I use a generator that produces sequences of letters rather than numbers. Let's say that the particular random letter generator I use is programmed to produce exactly 279,936 outcomes, each with equal likelihood, and that when I use the letter generator, I think of one of these letter combinations instead of a seven-digit die roll. Finally, imagine that sometimes I use a random *image* generator, which randomly shows me one of 279,936 different images I have previously viewed, and one of which I think of just before activating the generator.

The point is that it doesn't matter to the probabilities if I use the same generator with the same selection of possible outcomes each time or if I use different ones. As long as the odds of a hit remain the same for each use of the generator, it will remain true that, over 525,600 trials, I have an 84.7% chance of at least once seeing generated the particular 1-in-279,936 outcome I had in my head at the time of initiating that particular trial.

This problem generalizes to any spontaneous correspondence between events. If we want to calculate the probability of at some point experiencing merely by chance an event as personally significant as what we've actually experienced, we need to know how many times we've "used the generator." To put it another way, we can't take as evidence relative to PL only the occasions on which there is a striking correspondence between our mental state and some other event. We have to consider also the evidence against PL provided by all those occasions on which there was *no* striking correspondence between our mental state and other events we observed. Even if the outcome in *this one case* was highly personally significant, it will barely budge the overall strength of our evidence for PL if we have also used the observation generator billions of times throughout our lives *without* generating such a personally significant observation.

At the same time, some people have experienced correspondences that they intuitively feel are so improbable that they wouldn't expect to have them by chance even if they lived many lifetimes. To know whether this intuition is correct, we need some way of calculating just how many "misses" they've encountered that are comparable to the "hit" under consideration. Only then can we calculate the frequency with which they

should be expected to encounter comparable hits merely by chance, what I call “baseline correspondence potential.”

One way of attacking this problem is to estimate how much fodder for chance correspondences a particular subject S encounters: that is, the amount of information they encounter that’s generally accepted to be random with regard to their mental states. This kind of calculation is going to be extremely difficult since the amount of random information each of us comes across varies not only from person to person but from hour to hour, even minute to minute. Spending a minute staring at a blank wall provides a lot less opportunity for the occurrence of chance correspondences than does reading a book or walking down a street in a foreign city. Fortunately, we don’t have to calculate this quantity for every situation in our lives.

The Time-Slice Method for Calculating Baseline Correspondence Potential

We can greatly simplify our calculations of baseline correspondence potential if we consider an observation generator defined such that one “use” of this generator is responsible for producing absolutely everything observed by a subject S during a specified length of time. Say S observes an event E that seems highly correspondent to S’s mental state, even though there seems to be no physical way in which they can be causally related, and S wants to know if this improbable correspondence with her mental state is statistically significant. The first thing to do is to choose a length of time that contains the observation of the relevant event E. It’s best to choose a short period of time, because the second step is to consider all of the possible observations that S could have made during that same period of time, given a set of prior conditions C. That is, we need to explore as exhaustively as possible S’s probability space for that entire period of time.

One second seems like a reasonable period of time to presume to be able to do this to a useful degree of accuracy. So let’s say we explore the probability space of that second of time, thinking of the various observations that could have been made instead of or in addition to those that were in fact made by S during that second and what the probabilities of these other possible observations were, based upon our set of prior conditions C. Using this information, we determine what proportion of the probability space for that second would have been at least as personally significant to S as what actually occurred. Let’s say we come to the conclusion that only one-millionth of the probability space is as personally significant to S as what actually occurred. That is, there were chance odds of only 1 in 1 million that S would observe, in this second, something as personally

significant as what S did observe. To put it yet another way, the chance odds of E' occurring during this second were 1 in 1 million.

Now remember that we defined our observation generator in such a way that this single use of the generator was responsible for everything S observed during the length of time we chose to examine. That means that there is no question of whether another observation generator could have been running simultaneously to this one, thus increasing the odds of a personally significant outcome. If there was any reason to think there was the potential for S to make any additional observations during the time under consideration, that has already been taken into account in the exhaustive exploration of the probability space during that time. So, with regard to subject S, this is the only observation generator operating for the duration under consideration.

But how about determining how often this observation generator is operated throughout the rest of the life of subject S? Because we defined the generator as what produces the total observations made by S in the space of one second, we know it runs once per second for the entirety of S's life. And a hit in any of those other seconds is defined precisely the way it is defined in this one: as an event that is within the most personally significant one-millionth of the probability space for that second.

What this gives us is an observation generator that, over a lifetime, can admit of infinite variation in possible outcomes generated and in the mental states of S and yet keep the chance odds of a hit precisely constant over time, to match the chance odds of E' during the second under evaluation. For instance, with the odds for E' that we were considering above, we should expect hits at a rate approaching one out of every million seconds. That's approximately once every 11.6 days—or about 2,500 times over a lifespan of 80 years. The method tells us that coincidences of this level of significance are not going to be rare at all.⁷

But one in a million was a number I selected arbitrarily. There are people who report psychic-seeming correspondences much more improbable than this, as we will see in the next section when I apply this time-slice method to two real-life cases. Analyzing these examples will also give me occasion to explain two important refinements of the method: the first merely practical, the second crucial to obtaining evidentiary results.

Applying the Method

Example 1: Matching Descending Doubles

Andrew Paquette (2011) describes the following personal experience.

One night when Kitty and I were playing backgammon, I had a feeling similar to when I touched the doorknob and knew Sumi would commit suicide. It was nothing so dire, but was at least as strong; "Kitty," I said, "we are now going to roll Matching Descending Doubles, from sixes to ones." Kitty shook her cup and rolled double sixes. I rolled double sixes also. She rolled double fives and I matched them. She rolled double fours; I did likewise. She got double threes and I got double threes. She rolled a pair of twos, and I did the same. At this point, the staggering mathematical improbability of what I'd just seen hit me like a wave. I lost confidence and predicted we would not get the double ones. Kitty then rolled a pair of non-matching numbers. For visualization, here is the sequence we rolled: 6,6,6,6,5,5,5,5,4,4,4,4,3,3,3,3,2,2,2,2. (Paquette 2011:23–24)

As Paquette subsequently notes, the odds of rolling any particular 20-number sequence on a fair six-sided die are 1 in 3,656,158,440,062,976. Approximately 1 in 3.7 quadrillion. But given how many people there are in the world and how many events they are all observing day in and day out, maybe it's not that surprising that someone somewhere would once make a prediction this wild and have it come true. Let's apply the method developed in the last section and see just how often we should expect, on chance, to see such an improbable correspondence between two causally unrelated events.

We'll begin by dividing the probability space for the time of this event (duration as yet unspecified) into approximately 3.7 quadrillion equal parts, one for each of the possible 20-number sequences of die rolls. We'll consider in a moment further divisions of the probability space that may be needed because of the possibility of concurrent coincidences, but for now let's focus on this single set of alternative events. Among these 3.7 quadrillion possible events, how many would have been at least as personally significant to Paquette as the one that occurred?

I think we can make a very strong case that the actual roll sequence was the most personally significant to Paquette of all 3.7 quadrillion possible sequences. This is not because none of the other possible sequences would have been significant to him at all. If he and his wife had rolled each of their social security numbers in succession, that certainly would have been significant to him. Or if they'd rolled both the home phone and cell number of someone Paquette had just recently been thinking about calling. However, as Paquette recounts the case, just moments before rolling this sequence, he experienced a strong conviction that they would roll the sequence of matching descending doubles that was actually produced (minus a coda of four 1's that they didn't manage to roll). This strong feeling, along with Paquette's subsequent announcement of his prediction to his wife, are

enough in my view to make that particular 20-roll sequence the single most personally significant of all those possible.

But, you might ask, what if Paquette makes these kinds of predictions all the time? In actuality, he states that he has only made a prediction of this sort three times in his life, each time with a similarly successful result (Paquette 2011:25–26). However, we don't need to rely on that information if we are using the method described in the last section, because the possibility that he could have done this is *factored into the method itself*. In the final step, the time-slice method will take into account all of the many other equally strong correspondences Paquette could have chanced upon throughout his life, including ones that could have arisen from his repeating this same prediction as many times as physically possible.

But before we reach that step, we need to fill out our understanding of the probability space during the time of this event and determine the duration of time for which we have the probability space thoroughly described. Let's say that it took Paquette and his wife 10 seconds to roll all the dice in this sequence. How much additional information was Paquette capable of observing during those 10 seconds? For instance, if the lights in the room had flickered, would he have been able to observe that while continuing to observe the outcomes of all the die rolls within 10 seconds? Or would making that observation have slowed his observation of the rolls to some degree? The distinction between a possibly simultaneously observed event and one that displaces the observation of the first event to a later time is crucial, because if observation of a second event would *displace* the observation of the first, then it is not truly a possible simultaneous event but rather a possible *alternative* event.

Considering a possible *simultaneous* event is not going to reduce the size of the probability space occupied by the event E already under consideration. Instead, it opens up the possibility that, no matter which of the 3.7 quadrillion roll sequences had been observed, something *else* could have been simultaneously observed that would have been *at least as psychologically significant* to Paquette as E. Say that another couple was simultaneously rolling dice beside Paquette and Kitty, and Paquette was able to observe all of their rolls as well as his and his wife's in just 10 seconds. The probability that Paquette would observe within those 10 seconds his most personally significant 1 in 3.7 quadrillion rolls *being rolled by that other couple* would be itself 1 in 3.7 quadrillion. This almost doubles the probability space occupied by the event constituted by at least one of the couples' getting that 20-roll sequence, which means that, in that case, E' would be already almost twice as likely as E alone.

On the other hand, if Paquette is not capable of observing all of these

dice at once—if observing the other couple means he is slower in observing his own rolls—then the observation generation is not simultaneous. Rather, it *displaces* the first process of observation generation to a slightly later time. And that means that it is an *alternative* within the ten seconds in which Paquette actually observes the original event corresponding to his mental state. Alternatives make the probability of the events they displace *less* likely the more alternatives there are during the time period in question. Thus it's of no use for a skeptic to list all the possible corresponding events that could have happened *instead* of Paquette's die rolls. Any alternative event we take into consideration just makes the improbability of this already very improbable event (the 20-roll sequence) even higher by shrinking its portion of the probability space—*unless*, of course, the probability that a distracting event would be at least as personally significant to Paquette as the actual 20-roll sequence is *higher* than the probability of he and his wife rolling that sequence. But it's hard to see how this could be the case here. Paquette's state of mind, as evidenced by his prediction spoken to his wife, is clearly focused on one very particular sequence of die rolls. It's hard to see how any event could correspond as closely to his mental state at this time as the actual 20-roll sequence he witnessed. Which means that, if we choose to simply ignore all possibly distracting events, we are actually erring on the side of a *conservative* estimate of the evidence that this event provides for psychic causation influencing the dice.

Now this won't be true in every case, or even in most. We will see in Example 2 below that the probability of alternative events can be quite important to determining the overall significance of a spontaneous correspondence. But it happens that, in this case, Paquette's mental state is so closely tied to the rolls of these very dice that no distracting event is going to be able to rival the outcome of these die rolls in significance.

However, if appealing to alternative events is not going to help a skeptic reduce the improbability of Paquette's coincidence, where the skeptic *can* look for help is in the issue of *simultaneous* outcomes, discussed above. But the skeptic is going to have to show that the outcome of a simultaneous observation generator *could have been observed simultaneously* to the rolls that were actually observed. For the dice rolled by a nearby couple to qualify as a simultaneous outcome, it must have been possible for Paquette to observe the outcomes of all 40 die rolls during the timeframe we're considering. If we say that he could have observed them all, but it would have taken twice as long, then we've effectively admitted that the other couple is not a simultaneous observation generator but an alternative one.

But a simultaneous observation generator needn't be another couple rolling dice. As mentioned before, the lights in the room could have flickered

during his observation of the die rolls. Or Paquette could have heard a neighbor yell out, “Matching Descending Doubles!” Or there could have been an earthquake. Or the TV might have been on, and a commercial might have come on displaying someone rolling dice and getting a sequence like the one Paquette predicted. The crucial question is this: How much extra attention did Paquette have available for observing additional information during the 10 seconds in question? And how probable was it, on chance, that that extra attentional space would be filled with information at least as personally significant as the matching descending doubles he did observe?

I think the answer to the latter question is “exceedingly improbable,” for reasons mentioned above: namely, that the prediction he made so narrowly focuses his state of mind on these particular rolls that it’s hard to see how *any* other event could be as personally significant to him as getting the precise roll he predicted in precisely the way he predicted it.⁸ Nevertheless, even if there were the possibility of some other event possibly matching that roll sequence in personal significance for him, there’s a way we can avoid having to answer the question of how probable such a significant simultaneous outcome would be.

If it seems that observing 20 die rolls in 10 seconds, say, would leave Paquette with additional attention with which to observe other simultaneous processes, all we need to do is reduce this span of time until we are reasonably certain that it is the minimum time necessary for Paquette to observe the rolls of the 20 dice. Again, to be very conservative (in the direction of underestimating the significance of Paquette’s coincidence), we could estimate this minimum at 2 seconds. I don’t think anyone but the most highly trained dice observer could observe more than 10 rolls per second.

This leads to my first refinement of the method.

Refinement 1: To simplify application of the method, one may set the duration of time to be examined as the *minimum time necessary for S’s observation of E*. Then simultaneous events need not be considered in the description of the probability space.

Returning to Paquette’s case, if we take 2 seconds as the duration of time for which we have thoroughly searched the probability space and for which we have found that the odds of Paquette’s observing an event with at least as much significance as the actual roll sequence he did observe are at most 1 in 3.7 quadrillion (leaving out the possibility that he might get distracted), that means that we have conservatively estimated that Paquette’s psychic-seeming experience is the sort of thing that we should expect to happen to any particular individual by chance about once every 7.4 quadrillion

seconds. Since there are around 2.5 billion seconds in an 80-year lifespan (about the average lifespan in the developed world), a correspondence of this strength should be expected to happen by chance to approximately 1 in 3 million people sometime in the course of their life. (Again, this estimate errs on the side of saying the event is more common than it probably is, because it doesn't take potential distractions into account and because the minimum time it would take Paquette to observe the 20 rolls is likely longer than 2 seconds.)

So what should Paquette conclude about PL? He might think to himself, "Well, in a world of 7 billion people, something this wild was bound to happen to over 2,000 of them just by chance, so it doesn't actually imply anything about the truth of PL." This, however, would be an improper application of the Law of Truly Large Numbers. While it may very well be true that something this wild should be expected to happen just by chance to 2,000 people in the world, if we don't know how many of the 7 billion people in the world it has *actually* happened to, we can't say that this one person's experience is irrelevant to our determination of the weight of the evidence. The fact that one of the people whose experiences we are familiar with *has* experienced it makes it epistemically more likely that other people have as well. The Law of Truly Large Numbers is often misused in the way I've just illustrated, but in fact *it is proper to employ the Law of Truly Large Numbers only if one has data for those truly large numbers.*⁹

In Paquette's case, this means that, if Paquette doesn't know *how many* of the other 7 billion people on earth have experienced something this improbably significant, then the fact that there are 7 billion people on earth is irrelevant to his calculations. Instead, he's going to have to think carefully about how many people he knows who, if they'd had a similarly significant experience, would have somehow communicated it to him. He could begin estimating this number by considering how many people he's told about *his* experience. Say he's told 1,000 people in person about this experience, and that 50,000 other people have learned about it through his book and the Internet. We'll assume (again conservatively) that any one of these people who'd had an equally significant psychic-seeming experience would have contacted him about it. That gives us a total of 51,000 people whom he could expect to have heard from if they'd had an experience as astounding as his. We should probably add to this the authors of any books Paquette has read who could be expected, because of their subject matter and apparent candor, to have related such an experience if they had had it. Even if we allow that Paquette has read a thousand books whose authors meet this description, our total—52,000—is still clearly nowhere near 3 million. And, in fact, if the average age of the folks whose experiences

Paquette is acquainted with is only 40 years old, he would actually need reliable knowledge that *6 million* people have not had any psychic-seeming experiences this personally significant in order to counterbalance the evidence provided for PL by this single experience of his.

In sum, this single psychic-seeming correspondence is so improbable on chance that the evidence it provides for PL is so strong as to overwhelm any reasonable difference in prior probabilities between PL and \neg PL and to make the strength one selects for PL all but irrelevant. On any reasonable values of these variables, this personal experience gives Paquette extremely strong reason to believe PL.

Example 2: The Scarab under the Mat

Let's now apply the method to a less clear-cut correspondence, this time one from my own life. One afternoon I was sitting on my front porch reading a book about meaningful coincidences, which in turn got me thinking about several coincidences I'd previously encountered and the pattern they seemed to form. A phrase came into my head—"It's bigger than you know"—which I understood to refer to the pattern behind these coincidences I'd experienced. At this point, I stood up and began to walk inside the house. When my bare foot hit the welcome mat that sits just outside the door, I felt a lump in it and immediately thought to myself that I needed to look under the mat, because whatever was there might be a coincidence related to my current thoughts.

When I lifted the mat, I discovered a giant scarab beetle, over an inch long and about three quarters of an inch wide. I couldn't remember ever at another time encountering such a beetle in the wild, even though I'd lived 25 of my 35 years of life within a 30-mile radius of that location and spent a fair portion of that time outdoors. In fact, I was so fascinated by this insect that it took a moment for the significance of the coincidence to sink in: I had just been thinking hard about personally meaningful coincidences, and in the Western world the symbol most closely associated with meaningful coincidences is a scarab, due to a well-known story recounted by Jung (2010:22, 109–110).¹⁰ Furthermore, this scarab was quite large—much bigger than any beetle I'd seen before in the wild—and its size seemed to echo the phrase I'd heard in my head: "It's bigger than you know." Overall, the feeling produced by this event was that it confirmed, in an artful and highly improbable manner, the conclusion I had just come to about the pattern of coincidences in my life.

Let's now attempt to determine the baseline correspondence potential for this case. Following Refinement 1, we will first determine the minimum time required for me to observe E. In this case, two observations combined

to constitute my observation of E: First I noticed the lump in the mat, then I lifted the mat and saw the scarab underneath. Let's estimate the minimum combined observation time as one second. That is, it would take me at least one second to process all the relevant tactile and visual information and come to a conclusion about what I was observing. I think this is a fairly conservative estimate given the novelty of the information in question.

Let's now do a preliminary exploration of the probability space during this second. Let's focus first on all the other things I could have found under the mat. How many of them would have been at least as personally significant to me in that moment? The first thing that springs to mind as being possibly *more* significant is a golden or metallic green scarab. In Jung's anecdote, one of the scarabs was golden and the other metallic green; neither was glossy black like the one I found. Jung relates that the live scarab that tapped at his window was of the species *Cetonia aurata*, while mine was a *Xyloryctes jamaicensis*. And though both of these are in the family Scarabaeidae, another member of this family is much more common where I live and more closely resembles the color of Jung's *Cetonia aurata*. This is the Japanese beetle, *Popillia japonica*, which I know as a common garden pest. Nevertheless, I didn't know until researching this paragraph that Japanese beetles were scarabs, nor that the scarabs in Jung's anecdote were golden and metallic green. If I'd found a Japanese beetle under the doormat—and I may have never even noticed its presence, since they're so small, being at most half an inch long—I would have been so unsurprised that I would have paid it no further heed and probably never thought of connecting it to Jung's scarab. That is to say, for me, with my particular array of conceptual associations, Japanese beetles were not nearly as connected to the concept of *scarab* and thus to the concept of *coincidence* as was the much larger, black scarab I actually found. For this reason, among all the insects and other small creatures I've had occasion to observe in my home climate, I don't believe there's any so closely corresponding to my state of my mind at that time as the large, black scarab beetle I indeed found.

But what about non-living things that I might have found under the mat or been otherwise confronted with during the second it took me to feel the lump under the mat and look underneath? I can think of only a few that would have borne a closer relationship to the concept of meaningful coincidence. For instance, I could have found a copy of Jung's work *Synchronicity* that someone had left for me beside the door, or a note with Jung's name scrawled on it, or perhaps a photograph of him. Or I might have heard a neighbor yell out, "It's not a coincidence!" Or perhaps heard a plane fly overhead and turned to see that it had produced the phrase "Bigger than you know" in skywriting.

On the other hand, we should also consider that I might have observed something that, instead of evoking meaningful coincidences in general, would have borne a relationship to the particular patterns of coincidences I'd been contemplating in my life, coincidences with a couple of overarching personal themes. I can come up with a few ideas for items I could have found under the mat that would have borne as strong a relationship to those personal themes as the scarab bore to the idea of meaningful coincidence, but the likelihood of my finding them under the mat at my front door, or somehow else being confronted with them at the moment that I was stepping on the mat or bending to look under it, seems much smaller than the probability of my finding the scarab.

But before we can determine just how probable it was that I would observe E' (something at least as personally significant as a giant scarab) or even that I would observe E (a giant scarab), we need to answer another crucial question: Which elements of the situation are we keeping fixed? The more detail we use in specifying these conditions C , the more probable the observation of the scarab will appear and the less probable alternative events will appear. For instance, in specifying C in the scarab case, we could include information about local scarab populations, the lumens and wavelength of my front porch light, the events that led this particular scarab to crawl under my mat, etc. If we knew enough about the state of the world in the instant before I saw the scarab under the mat, the probability of my observing a scarab in that next instant could be close to 1 and the probability of observing anything else close to 0.

This demonstrates that the probability we're interested in is not some "objective probability" of E occurring at T . It may have *seemed* that way in the Matching Descending Doubles case, but even there, if we had factored in the starting positions of the dice, the movements of the rollers' hands, the movements of air molecules, etc., then the actual way in which the dice fell may have had an objective probability near 1.¹¹ What we want to know in asking about the probability of an event E is its probability given only some basic facts about the physical situation and no causal connection to S 's mental state. Think of us as simulating an experiment where we repeatedly run the same scenario (e.g., rolling a die 20 times or looking under a doormat) to see how frequently E occurs in the absence of a causal link to S 's mental state.

In selecting our constants, we should consider whether any of the facts we're proposing to take as given—say, the fact that I was on my front porch rather than somewhere else—is a fact that could itself have been psychically caused or influenced. In the case of Matching Descending Doubles, we don't hold constant the movements of air molecules and the movements

of the rollers' hands because (1) we don't believe these conditions were physically influenced by Paquette's mental state and (2) these are precisely the conditions that, if there was something psychic going on, psychic causes *would* be expected to influence. The same is true for the scarab. If some psychic force "brought" this scarab to me, it likely didn't do so by materializing it out of thin air. It's more likely that it somehow persuaded a scarab who was already in the neighborhood to burrow under my mat. We have to leave open the possibility that psychic causation will bring about E *in the most physically probable way*. And thus, if we want to measure the full extent of unexpected correspondence between E and S's mental state (that is, correspondence unexpected on \neg PL), we will make our constants as few as possible, not holding constant any circumstance that psychic causes might have already affected.

For instance, let's say we find out while researching the probability of scarab sightings that, on the particular day on which I saw the scarab, an unusual swarm of scarabs had just arrived in my county. Since this happened before I saw the scarab, do we take it as part of the conditions C that we hold constant, or do we take the fact that these scarabs arrived in my county just before my deep thoughts about coincidences as itself *part* of the correspondence to be explained? Which choice we should make depends on what kind of psychic link we want to test—i.e. whether we are hypothesizing that, if the psychic link exists, it could have influenced the arrival of the swarm of scarabs (or, influenced me to think about coincidences on the day the scarabs were in town). I think the psychic link most people are curious about investigating is one that has some substantial ability to affect the pre-existing circumstances of the coincidence.

Consider a different case where I didn't see the scarab on my front porch but instead saw it when I was visiting a state I'd never visited before that day. Say I later discover that, while scarab sightings are very rare in my home state, in this state they are exceedingly common. In this case, do we take the fact that scarab sightings were very common in the place where I was as a given, or do we consider that part of the coincidence was that I happened to travel to a place where scarab sightings were common? As long as I didn't travel to that state *because I knew there were a lot of scarabs there*, there seems no good reason not to consider the fact that I went to a scarab-infested state as possibly part of the psychic effect we are testing for.

But just how far do we take this? For instance, do we take the fact that I was outdoors at the time I saw the scarab as a constant or as part of the possibly psychic effect? Presumably, seeing a scarab (a real one, at least) would have been much more improbable if I had stayed indoors. Thus, if I measure the probability of seeing a scarab *anywhere*, that will be lower than

if I look at the probability of seeing a scarab *when I'm outdoors*. Should we then allow that psychic causes might have brought me outdoors to have my rumination on coincidences so that I could observe the scarab? If so, we should take the probability of my seeing a scarab *anywhere* as determining the probability space we're working with.

But what if we are interested in knowing about probable psychic causation at *any* point in time, in relation to *any* variable that helped produce E? If we take the most extreme path, where we hold absolutely nothing constant—not even the laws of physics—then it's hard to see how we could define the probability of any event whatsoever, unless it's merely by the event's logical possibility or impossibility, which won't tell us much. So we will likely decide, for practical purposes, not to routinely investigate the kind of psychic influence (or psychic holism) that would stretch all the way to selecting, say, the physical constants of the universe.¹² We are going to want to narrow our focus by choosing to hold *some* things constant.

But which things? One set of facts it's imperative to hold constant is all the facts that could plausibly have influenced or been influenced by the subject's mental state in a non-psychic way. For instance, if my interest in the topic of coincidences led me to attend a conference on synchronicity, and while at that conference I saw a poster featuring a scarab, it's important that I measure the probability of seeing a scarab poster *at a synchronicity conference*, not the probability of seeing one in the world at large. On the other hand, if I were walking in a strange city and happened upon a synchronicity conference where I saw a scarab poster, my presence at the conference would *not* be something to hold constant.

There is one other crucial requirement in selecting constants: *that the same constants be used in all our calculations*. Most important is that we use the same constants when calculating $P(E'|PL)$ as when estimating or selecting a value for $P(E'|PL)$. But we should also be careful, if we make separate calculations of the probability of E and the probability of all the other events that are part of E', to use the same constants in those cases as well. For instance, we shouldn't measure the probability of seeing a scarab over all locations, outdoors or in, and then, when we go to consider all the other events that make up E', only consider ones that would occur in the actual location of outdoors.

These two absolute requirements on constants leave us with quite a bit of leeway. Of course, the limits on our knowledge of the actual situation will be a further, practical constraint since we can't hold constant a fact if we don't even know whether it obtained in the actual situation. But beyond that, what could help us decide what other facts would be useful to hold constant? I propose we try to balance two primary considerations. The first

is the availability of data. The more narrowly we define the situation in question, the less data there will be available for situations of this kind. The second is that, if we choose a level of generality much wider than the sphere in which the psychic cause is actually operative (should it exist), we run the risk of swamping the effect: making it look small when, within the context in which it's operating, it's actually quite large. So, if we doubt that the psychic cause under consideration would influence certain factors in the situation, it makes sense to set constant as many of those factors as we can.

Let me summarize the most important takeaways regarding the choice of constants.

Refinement 2: Choosing Constants. There are two essential conditions in the choice of constants:

- 1. Any features of the situation that correspond to the subject's mental state as a result of a non-psychic connection between them must be held constant.**
- 2. The same constants must be employed in all calculations—specifically, in determining both $P(E'|\neg PL)$ and $P(E'|PL)$.**

As long as the above conditions are met, choice of constants may be based upon:

- a) how widely one wants to cast the net for possible psychic causation, and**
- b) which constants figure in the best data at one's disposal.**

Let's return now to the case of the scarab. Let's try to determine just how improbable it was that I would observe a giant scarab during the second under consideration. In deciding how widely to "cast my net" for psychic causation, I am going to hold constant that I was at home at the time (I'm not worrying about whether psychic causation may have influenced my being at home) as well as the fact that I was not reading anything or watching or listening to the television or radio. However, I am not going to hold constant the fact that I was outdoors, nor the fact that it was daytime. That is, I am going to allow the possibilities for potential correspondences to range over anything I might observe when I'm at home, outdoors or in, day or night, when I'm not reading or exposed to television or radio.

Unfortunately, my Internet research on the likelihood of observing one of these large scarabs has turned up no useful statistics, so I am going to have to estimate this likelihood based on my own experience—even if this might make the event seem more probable than if I had a larger sample. At the time of this experience, I had lived 35 years of life with only one sighting of such a scarab, and I would estimate that over those 35 years I

had been “at home” (in one of my successive places of residence) about 22 hours out of every day. Over 35 years, that comes to about 1.01 billion seconds. Based on the fact that I only saw one giant scarab in this time, we will estimate the probability that I would observe a giant scarab in any particular second at home as on the order of 1 in 1.01 billion.

Now we have the issue of adding in the probability of my observing some *other* correspondence at least as personally significant as the giant scarab. How many such random occurrences of coincidence-related events can I recall experiencing around my home, at any time in my life? Again, appealing to my own experience may overestimate the chance probability of such events, or possibly underestimate them, since on most occasions such events wouldn’t have stuck out to me as strongly as this scarab did, because I wouldn’t have been thinking so hard about coincidences just prior. But, despite its shortcomings, appeal to personal experience seems the only available strategy in this case for coming up with a number that’s even close to accurate.

So let’s take a stab at a number. Remember that we’re looking for not just any random mention of a coincidence by someone in my company, but one that has a connection to *meaningful* coincidences, which Jung called “synchronicities.” Also recall that, in addition to bearing a relationship to meaningful coincidences, the scarab, in being so large, corresponded to my thought “It’s bigger than you know.” To rival the giant scarab in personal significance, an alternative event would similarly have to have some additional element of correspondence with my mental state.

I am going to estimate the number of times I have ever experienced, at home, an event not provoked by my interest in coincidences but just as closely related to “synchronicities bigger than you know” as perhaps 4 in my entire life. If we add this to the probability of observing a giant scarab, we get an overall chance probability for E’ in this second of 5 in 1.01 billion, or 1 in 202 million. That means that I end up with an estimate of the overall odds of experiencing anything in this second at least as significant as what I did experience as 1 in 202 million. Meaning this is the sort of correspondence I should expect to encounter by chance once every 6.4 years or so. This is not nearly as significant a correspondence as Paquette’s, but it’s not tiny either. The question is whether I’m encountering events like this significantly *more* often than once every 6.4 years. If so, then I may have reason to think that on at least some of these occasions I’m experiencing the result of psychic causation of some kind. Whether I do have reason to believe this will depend on just how large the deviation from chance expectation is, what prior probability we assign to PL, and what strength of PL we are considering.

A Caveat and a Further Application

In closing, I want to make some further comments about what baseline correspondence potential can and cannot tell us. It *can* tell us how often we should expect by chance to encounter correspondences at or above a particular level of improbability. That is, it gives us a baseline against which to compare our actual rate of observation, to determine whether it's above chance. The virtue of this approach is that it allows us to show that certain correspondences—like that recounted by Paquette—are *so* improbable that it is extremely unlikely on chance that we would ever encounter them in an entire lifetime, or even in 3 million lifetimes or more. However, this method does *not* show that correspondences occurring at or even below the baseline rate over one lifetime (or several) can't be evidence for a psychic link. Those coincidences could still be evidence for PL if their distribution within that lifetime bears a pattern that is more probable on the hypothesis of PL than on \neg PL.

Consider, for instance, the commonly made observation that people experience stronger and more frequent psychic events during times of heightened emotion and/or stress. Psychiatrist M. Scott Peck (1978), for instance, claims to have seen numerous such events occurring at crucial moments in his patients' lives with a resulting beneficial effect on their mental health. He writes

I have come to believe . . . that these phenomena are part of or manifestations of a single phenomenon: a powerful force originating outside of human consciousness which nurtures the spiritual growth of human beings. (Peck 1978:260)

Note that by referring to a "force originating outside of human consciousness," Peck is not ruling out that this force originates in the human *unconscious*. Many parapsychologists hypothesize something like this: that strong desire and need—whether conscious or unconscious—produce powerful psychic effects in the physical world.¹³

Now, if psychic events do tend to occur more frequently in periods of heightened psychological need (even if at a rate no greater than chance overall), this non-random pattern could provide evidence for a certain kind of psychic link: one that occurs more readily in periods of heightened psychological need. But while skeptics concede that people do experience stronger and more frequent correspondences between their mental states and independent events during these times, they explain this non-random distribution as the result of people being more attentive to such correspondences during such times. There's no objective increase in the

number of significant correspondences, they say, just an increase in the number people notice.

But this is another way in which the time-slice method of finding baseline correspondence potential can be helpful: It allows us to control for potential observation bias in this case. Armed with this method, we don't need to know how many correspondences people are ignoring when they are not in a state of heightened psychological need. We only need to estimate how much time a particular person or group spends in such a state and see whether the correspondences experienced by them in that state exceed the baseline correspondence potential *for that period of time*.

Thus the method of finding baseline correspondence potential does *not* say that an insignificant deviation from the baseline for an entire life means that a correspondence or set of correspondences is not evidence for psychic causation. It could still be evidence for psychic causation within some subset of cases, if the data within that subset deviates significantly from the baseline for the time period covered by that subset.

It might be objected that this leaves open the possibility of someone selecting a subset of cases with the express purpose of choosing only cases that support a psychic link. Of course, fabricating an ad hoc hypothesis is something to guard against when investigating any phenomenon, not just a purportedly psychic one, but what is needed specifically in the psychic case, to prevent a hypothesis from being ad hoc, is some commonality among the cases to which we choose to restrict our attention, a commonality that we have independent reason to believe would be conducive to the operation of psychic causation.¹⁴ In the example discussed above, we do have such an independently justifiable commonality: the presence of heightened psychological need. It is very easy to see why this hypothesis about the operation of psychic causation is more likely to be true than a hypothesis that appeals to some ad hoc disjunction of properties—it is exactly the sort of pattern we would expect to see from an agent who had a *purpose* in influencing the world psychically,¹⁵ specifically, the purpose of meeting strong psychological needs.

Another characteristic that may set apart certain circumstances as conducive to psychic causation is a subjective feeling that something psychic is at work. Paquette's case is an example of this. So is the "special feeling" or "anomalous attention" that William Braud (1983) proposes to employ in order to predict which words in a person's experience are likely to be repeated in the near future at a rate greater than chance. In a similar vein, Stevenson (1968) writes, about testing the precognitive properties of dreams. that "the proper comparison to be made is not that between all dreams and all events, but that between dreams (or other experiences)

thought by the subject to be significant (at the time they occurred) which are veridical and those which are not” (p. 113).

It makes sense that, if psychic causation exists, its occurrence would be accompanied by a unique subjective feeling that alerts the subject to pay attention. What is more, the occurrence of such feelings before the full constellation of corresponding events has been observed provides occasion for *predicting* psychically caused events, in much the way Paquette reports to have done. I can’t see why a skeptic should object to restricting cases of interest to those in which a strong subjective feeling of the operation of psychic causation is experienced, and regarding significant deviation from baseline correspondence potential *in these cases* as evidence for actual psychic causation. After all, this is the way any other phenomenon is studied: One focuses one’s attention on the cases where one has reason to expect the phenomenon, and the evidence for its existence in those cases is dependent on how large the deviation from chance is *in those cases*, not on how large it would be if averaged over all cases, even those where we have no reason to expect the phenomenon.

In conclusion, if we see that the rate of observed correspondences exceeds the baseline correspondence potential within a subset of cases selected according to some independently plausible principle, this will indeed constitute evidence for psychic causation in the occurrence of those correspondences. And the time-slice method I’ve outlined will be useful for calculating this baseline probability in such a subset of cases, in addition to over all the experiences had by an individual or group.

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Notes

- ¹ See as well the surprising admission of Michael Shermer (2014), publisher of *Skeptic* magazine. When he himself experienced a striking and emotion-laden “anomalous event,” he said it “rocked me back on my heels and shook my skepticism to its core.”
- ² I do not intend to draw any philosophically momentous distinction between events and states. I assume that we generally call a relatively short-

lived state an “event” and a relatively long-lived event a “state” but that these categories are essentially interchangeable.

³ I say a “union” of events because in probability theory events are understood as sets of outcomes.

⁴ I thank Stephen Braude for pointing out these two objections to this argument.

⁵ For a similar survey with respondents educated in fields in addition to science, see Wagner and Monnet (1979).

⁶ $1 - \left(1 - \frac{1}{279936}\right)^{(365 \times 24 \times 60)} = 84.7\%$

⁷ Readers may note some similarity between this conclusion and “Littlewood’s Law of Miracles,” attributed to mathematician J. E. Littlewood by physicist Freeman Dyson. In a 2004 *New York Review of Books* review titled “One in a Million,” Dyson writes,

[Littlewood] defined a miracle as an event that has special significance when it occurs, but occurs with a probability of one in a million. This definition agrees with our common-sense understanding of the word “miracle.” Littlewood’s Law of Miracles states that in the course of any normal person’s life, miracles happen at a rate of roughly one per month. The proof of the law is simple. During the time that we are awake and actively engaged in living our lives, roughly for eight hours each day, we see and hear things happening at a rate of about one per second. So the total number of events that happen to us is about thirty thousand per day, or about a million per month. With few exceptions, these events are not miracles because they are insignificant. The chance of a miracle is about one per million events. Therefore we should expect about one miracle to happen, on the average, every month. (Dyson 2004)

Some web sources cite *Littlewood’s Miscellany* (Littlewood 1986) as a source for Littlewood’s Law, but it does not appear there. The closest Littlewood gets in that book to something resembling Dyson’s description is when he states on page 104, “With a lifetime to choose from, 106 : 1 is a mere trifle.” In personal correspondence on January 24, 2017, Dyson said that he thinks he remembers hearing Littlewood state his “law” when Dyson was a student at Cambridge, where Littlewood was teaching, but he is unaware whether Littlewood ever put it into print (one could also try *A Mathematician’s Miscellany* by J. E. Littlewood, Andesite Press, 2017). In any case, I regard Littlewood’s Law of Miracles as a good starting point for the statistical analysis of spontaneous psi-suggestive experiences, but in need of much refinement, some of which I hope to provide in this paper.

⁸ What is more, Paquette indicated in personal correspondence on October 30, 2017, that,

at the time of the Matching Descending Doubles incident, we lived deep in farm country outside Putney, Vermont. The nearest neighbor was half a mile away, but couldn't be seen or heard from the house we rented. Also, although we had a TV, we didn't have cable, so we only used it for VHS tapes, which we never played while doing something else in the dining room, like playing backgammon. We also didn't have a radio.

⁹ If you require convincing of this, consider the implications of there being no such restriction on the employment of the Law of Truly Large Numbers. In that case, one could reduce the strength of any evidence for any hypothesis whatsoever to next to nothing merely by citing the existence of enough intelligent extraterrestrial beings, saying something like, "After all, in a universe of 700 trillion quadrillion intelligent beings, someone was bound to get these experimental results just by chance." But we quite rightly don't take the strength of our ordinary scientific evidence to depend on how much intelligent extraterrestrial life exists.

¹⁰ I have more than once seen depictions of scarabs on the covers of books about coincidences and in magazine articles on the topic. See, for instance, the cover of Peat (2014) and the title image of Blake (2015).

¹¹ That is, if we assume that the fall of the dice was not dependent on any quantum events, which do appear to be objectively probabilistic.

¹² Some researchers *are* interested in this question, however. They are interested in determining the significance of what we might call the biggest, most comprehensive psychic-seeming event of them all: the way in which the laws of nature, the physical constants of the universe, and the initial conditions of the universe have all turned out to fit within the very narrow range necessary for life to exist (see Collins 2009). For an argument as to why the multiple universe hypothesis does not make the fine-tuning of our universe any less improbable, see White (2000).

¹³ See, for instance, Braude (2003:13).

¹⁴ For discussion of this topic, see White (2003).

¹⁵ For a similar argument, developed in detail, see White (2007).

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