

Do Souls Exist?: A Gedankenexperiment

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Abstract

We calculate some physical properties of hypothetical souls, hence presenting some methods for experimentally detecting them. Here there be *no* monsters.

1 Assumptions

The great Carl Sagan once wrote^[7][Chapter 10]: “Keeping an open mind is a virtue – but, as the space engineer James Oberger once said, not so open that your brains fall out.” With this in mind, we assume the existence of souls and observe whether the implications match the known laws of Reality.

Souls, whatever they are, are commonly hypothesized to be the minimal representation of at least the brains of human beings. Let us simply assume that this representation is physical and:

- A soul has a non-zero mass.
- A soul is reincarnated over generations.

2 Calculations

In Model 1, we consider the mass and density of an individual with an arbitrarily old soul. We say that the total mass of an individual is the sum of its body mass and its soul mass¹. While the body mass, B , stays constant over each generation, the soul mass increments by a certain constant value, C , in order to store the information of a lifetime. It is easily shown that in any generation t , the total mass of an individual with a soul of age t will have a total mass of $B + tC$. Supposing that the average human body^[5][Section 15.6.1] mass is

¹We construe the soul as a part of the body, so by ‘body’ we mean ‘body without soul’.

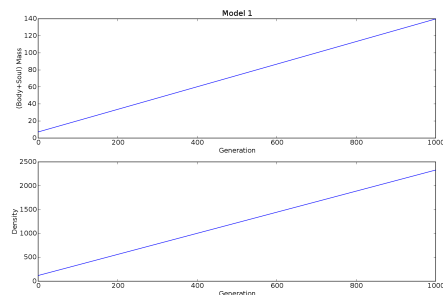


Figure 1: Model 1

7.142857143 kg (70 N/9.8 ms²)^[4][Chapter 9] and the average human body volume is 0.06 m³ and the average soul mass is the average human brain^[1] mass of 0.132653061 kg (1.3 N/9.8 ms²), some projections are shown in Figure 1. Given the constancy of an individual body volume and increasing mass in each generation, there might eventually be enough density to create a black hole under certain conditions^[8].

It is conceivable that while souls reincarnate, the body *and* soul masses of an individual remain constant over the generations and so we do not observe any trend of growth of population mass. In that case, a soul may store the information of, for example, one lifetime no matter how many reincarnations it goes through (C/tC). Thus in Model 2, we calculate for that case the ratio of how much a soul actually ‘remembers’ compared to how much it could if it ‘remembered’ all of its lives. As seen in Figure 2, this limited² soul naturally remembers less as it reincarnates further.

In Model 3, we keep track of the body and soul

²A critic may argue that a soul may somehow contain infinite information in a finite volume of space. Ord^[6][Chapter 4] notes that it is unclear whether this is physically possible.

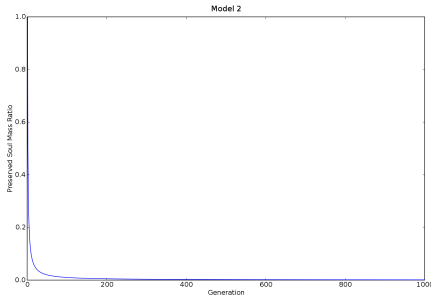


Figure 2: Model 2

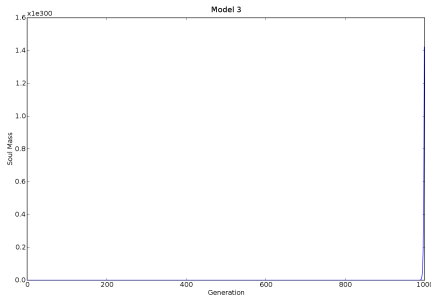


Figure 3: Model 3

masses of an entire population. Suppose that a population began with 2 members and doubled itself in each generation. Again, in every generation, the body mass of an individual is constant while the soul mass increments by a constant. However, due to varying population sizes, in each generation there are souls of various ages and there are some new bodies without any old souls left, so they are assumed to be ‘dynamically allocated’ with brand new souls. So, in generation 1, the total mass of the population is $2(B + 0C)$, in generation 2 it is $2(B + 1C) + 2(B + 0C)$, in generation 3 it is $2(B + 2C) + 2(B + 1C) + 4(B + 0C)$, in generation 4 it is $2(B + 3C) + 2(B + 2C) + 4(B + 1C) + 8(B + 0C)$ and so on. It is easily demonstrable that the general formula for the total population mass of generation t is $2^t B + (2^t - 2)C$. In this model, the population soul mass increases exponentially; see Figure 3.

3 Conclusions

There are some who think that alien visitors and, indeed, souls are here among us, but they are the invisible dragons in the garage³[7][Chapter 10]; no matter what you do, you cannot empirically detect them. We don’t see why this necessarily has to be the case (but we don’t wish to argue with those who insist otherwise).

Even if the mass of the soul was the Planck mass (2.17645×10^{-8} kg; the scale at which quantum gravity becomes important³[2, 8][Section 2, Section 2]), an increase of 2.17645 kg would be detected after 10^8 generations in at least one individual’s mass in the population.

And even if souls somehow consisted only of photons which have zero rest mass³, there are ways of detecting them: packets of photon are easily detectable, sometimes even by the naked eye³[4][Chapter 28]. At the right range of frequencies, people should be getting brighter over the ages. Secondly, if some souls are somehow detached from bodies and are traveling independently, alleged photographs of these lost souls imply that photons can reflect off these souls to be captured by film, and hence if they exist, they do not seem supernatural (literally ‘beyond nature’) as it has been claimed but rather natural as they can interact with natural particles. Thus, those who seriously claim that souls can be photographed must be able to pose a physical theory of that phenomenon! Thirdly, even if souls are made of energy and do not reincarnate, they can still be detected by known principles such as the conservation of energy³[4][Chapter 4] and so on.

There might be some who are willing to argue that the obesity epidemic is a sign of the increased memory of souls, but we are inclined to think that this will not be a popular argument. (At the very least, our knowledge on the function of fat cells would be radically altered.)

In the end, the point of this little tomfoolery is not to rationally convince anyone that souls as is popularly conceived most probably don’t exist (that would simply be futile given the human propensity for spirituality); it is to show that these matters can be explored scientifically. (We are aware that some people have tried postulating

³The importance of which we ignore here.

physical theories of souls, such as the Victorians with their fascination for thinking of souls as multidimensional beings; however, souls have yet to be detected through empirical predictions of such theories.) If souls are ever to exist, it seems that they must be created technologically⁴.

A Appendix

A.1 Source Code

The Python source code of the calculations mentioned above may be found [here](#).

References

- [1] Microsoft®Encarta®Online Encyclopedia 2006. chapter Brain. Microsoft Corporation, 2006.
- [2] John C. Baez. Higher-dimensional algebra and planck-scale physics. *arXiv.org e-Print archive*, (gr-qc/9902017), 1999.
- [3] Matt Austern et al. What is the mass of a photon? <http://math.ucr.edu/home/baez/physics/ParticleAndNuclear/photon.mass.html>, March 2006. Usenet Physics FAQ.
- [4] Richard P. Feynman, Robert B. Leighton, and Matthew Sands. *The Feynman Lectures on Physics*, volume I. Addison-Wesley Publishing Company, sixth printing edition, February 1977.
- [5] Robert A. Freitas Jr. *Nanomedicine*, volume IIA: Biocompatibility. Landes Bioscience, 2003.
- [6] Toby Ord. Hypercomputation: computing more than the turing machine. *arXiv.org e-Print archive*, (math.LO/0209332), 2002.
- [7] Carl Sagan. *The Demon-Haunted World: Science as a Candle in the Dark*. Headline Book Publishing, 1997.
- [8] Gerard 't Hooft. Horizons. *arXiv.org e-Print archive*, (gr-qc/0401027), 2004.
- [9] Roger Zelazny. *Lord of Light*. Eos, 2004.

⁴For a fictional source of inspiration, see[9]. Our next research topic is on whether soul mates exist.