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# Science and pseudoscience

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Pseudoscience (in Estonian also – ebateadus, libateadus) is defined as (Wikipedia):

- a body of knowledge, methodology, belief, or practice
- that is claimed to be scientific or made to appear scientific, but does not adhere to the scientific method
  - lacks supporting evidence or plausibility
  - or otherwise lacks scientific status
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# Amateur science, fringe science, and junk science are specific versions of PsSc

- Junk science is used to describe agenda-driven research that ignores certain standard methodologies and practices in an attempt to secure a given result from an experiment. Fringe science, as in standard methodology, proceeds from theory to conclusion with no attempt to direct or coax the result.
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# Why should we distinguish science from pseudo-science at all?

- Contemporary postmodernistic view: all reflections of reality are equal; 'useful' *versus* 'true'
  - OK, let's rely only on 'usefulness'
  - Paul DeHart Hurd (1905-2001): "...a large part of gaining scientific literacy is "being able to distinguish science from pseudo-science such as..."
  - epistemological disagreement about the extent to which it is possible to distinguish "science" from "pseudoscience" in a reliable and objective way
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# Main features of science are

- **falsifiability** (Sir Karl Popper 1902 –1994)  
Mario Bunge: "belief fields" and "research fields"
  - **reproducibility**
  - **statistical significance**
  - **well-articulated limitations**
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# Cues for identifying pseudoscience

- Lack of boundary conditions
  - Selective use of experimental evidence
  - Lack of openness to testing by other experts
  - Reversed burden of proof
  - Assertion that claims which have not been proven false must be true, and vice versa
  - Failure to make reasonable use of the principle of parsimony ('less is better')
  - Misuse of technical jargon in an effort to give claims the superficial trappings of science
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# These are main traits of PsSc

- Lack of progress and lack of self correction
  - Passion, personalization of issues and *ad hominem* fallacy (but ...)
  - Using established terms in ways demonstrating unfamiliarity with mainstream work in the discipline (but interdisciplinary...)
  - Easy and simplistic solutions to complex problems (but ingenious discoveries...)
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# What feeds PsSc?

- “PsSc speaks to powerful emotional need that science often leaves unfulfilled” ... “Scepticism does not sell well.” (C. Sagan, 1996)
  - “People do not need truth, rather they need consolation” (G. Naan, 1970.-ies)
  - “It is morally as bad not to care whether a thing is true or not, so long as it makes you feel good, as it is not to care how you got your money as long as you have got it” (E. W. Teale, 1950)
  - Specific reasons for amateur, fringe and junk sciences
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# Why should we not tolerate PsSc?

Rephrasing Sagan:

the siren song of PsSc is not just a cultural wrong turn but a dangerous plunge into darkness that threatens our most basic freedoms.

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Could true science lead to practically  
the same results as its worst antithesis ?

The speaker's speculation aimed to encourage you to think  
more about the theme...

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# SETI (Search for Extraterrestrial Intelligence)



<http://setiathome.berkeley.edu/>

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# Conclusion

**Choose your posture !**

It is morally as bad not to care whether a thing is true or not, so long as it makes you feel good, as it is not to care how you got your money as long as you have got it

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