EU-grant applications – Experience with ERC Advanced Grants

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The ERC Projects

• Understanding the underlying neurocognition and neurochemistry of auditory hallucinations in schizophrenia

• Use MR technology to image brain structure and function abnormality related to auditory hallucinations
Focus on a single symptom, auditory hallucinations, and track vertically through different «Levels of Explanation»

- **Cultural/Social**
  - Norms, beliefs, attitudes

- **Clinical**
  - Symptoms, syndromes, diagnosis

- **Cognitive**
  - Perception, attention, executive, language

- **Brain imaging**
  - Neuronal systems and networks

- **Cellular**
  - Synapses and neurotransmitters

- **Molecular**
  - Genes, DNA, proteins
Funding systems: Difference in focus

Societal challenge (SC) vs. Excellence (Ex) type

**Horizon 2020 (SC)**
- Top-down pre-determined thematic priorities
- Quality and the efficiency of the implementation
- Impact
  - A successful solution to a societal challenge is not necessarily excellent research

**ERC (Ex)**
- Bottom-up without pre-determined priorities
- Excellence of the research across topics
- Track-record of the PI

**ERC Guidelines for Applicants:** "...to support excellent investigators and their research teams to pursue ground-breaking, high-gain/high-risk research"

What does that mean?
What the Reviewers said...

Reviewer 4/10
“The project is both high risk and high gain; it will open up new trajectories for a better understanding of...”

Reviewer 5/10
“The outlined approach is highly feasible but not necessarily high risk/high gain, the methods are previously known...”

Reviewer 6/10
“The overarching goal of the project represents high risk/high gain...”

Reviewer 8/10
“...the project is high risk with scepticism for high gain.”

Do not overemphasize the «high risk» component, there is a thin line between ingeniousness and stupidity...
“ASKING A SINGLE QUESTION—WHY DO AHS FLUCTUATE?”
“A strong statement in the current proposal is that if we believe that AHs have neurocognitive underpinnings, or markers, and that there are neuronal changes behind the *elicitation* and *initiation* of a hallucinatory episode, a view that all available empirical evidence supports, then we must also acknowledge that the spontaneous *cessation* or *offset* of a hallucinatory episode must have corresponding markers, anything else would be solipsism.”

…and what the Reviewers said:

Reviewer 2/10
‘*One particular strength of the proposal is that it asks a single important question…*’

Reviewer 5/10
‘...the concept, in its stunning simplicity, may be novel in explaining ....’
Tell a story!

2. A core symptom in schizophrenia...
   Hallucinations occur in 70-80% of all patients and often produce distress, functional disability and behavioral dyscontrol (Liddle, 1987; Shergill et al., 1998)...
   **believed to be caused by inner-speech...**
   Two common explanations for auditory hallucination are that they are examples of inner speech, or traumatic memories (cf. Allen et al., 2007; Jones, 2008)....
   **...which however has obvious shortcomings ...**
   Although both models have their advantages in explaining auditory hallucinations in cognitive terms, they also suffer from shortcomings when taking into account both what patients actually report hearing and the different themes and contents of...
   **...leading to a perceptual view on auditory hallucinations.**
   The phenomenology of auditory hallucinations would thus rather point to an efferent (speech perception) than an afferent (speech production or memory retrieval) basis for auditory hallucinations. This would also be congruent with the fact that...

3. Experimental test of a perceptual view ...
   A straightforward way to empirically test if auditory hallucinations are related to deviation in speech perception, localized to the left hemisphere and temporal lobe, would be to test patients and healthy "voice hearers" in a dichotic listening (DL) situation
   **...using a dichotic listening approach...**
   The REA means measuring the...
   **...which would overcome the shortcomings...**
   ...etc, etc...
The ABT – method (not so common):
«We started this research with a hypothesis about addiction AND motor performance, BUT soon realized that cognitive factors interfere with performance, THEREFORE we included neuropsychological tests to first identify cognitive profiles, then…»

The AAA – method (much more common):
«We will study addiction in adolescents, AND living in Norway, AND under 20 years old, AND fond of cats, AND…, AND…

Science (but not necessarily research) means to:
Describe (And…)
Explain (But…)
Predict (Therefore…)
Science vs. Research

Science: ‘to have an idea’ / Research: ‘to test the idea’

Science is about:
- Idea
- Hypothesis

Research is about:
- Data
- Testing
- Funding

Today’s funding system promotes more and more researchers, but fewer and fewer scientists!
This is of course an exaggeration, science needs research and research needs science, the two are mutually interdependent.

Fine-tuning the breakthrough: Quantitative developments that will lead to new qualitative breakthroughs, that will need more fine-tuning, that will lead to…
Er oppdagelsesiden tid forbi?

VITEN

Agens forskere har flust av ressurser. Hvorfor kommer da ikke nyomere forskningsfunn på løpende bånd?

What may lie behind this development?

«Are there no more discoveries to be made, all what matters have been discovered?»

«Other factors must be considered, today’s funding system is working against great breakthroughs»

KH added: Today’s funding system promotes more and more researchers, but fewer and fewer scientists.
Nevertheless, the advances are mostly incremental, and largely focused on newer and faster ways to gather and store information, communicate, or be entertained. Here there is a paradox: Today, there are many more scientists, and much more money is spent on research, yet the pace of fundamental innovation, the kinds of theories and engineering practices that will feed the pipeline of future progress, appears, to some observers, including us, to be slowing.

“In fact, maybe it has become too easy to collaborate. Great ideas rarely come from teams. There is, of course, a role for “big science” (the Apollo program, the Human Genome Project, CERN’s Large Hadron Collider), but teamwork cannot supplant individual ideas. The great physicist Richard Feynman remarked that “Science is the belief in the ignorance of experts.” In a 2014 letter to The Guardian newspaper (11), 30 scientists, concerned about today’s scientific culture, noted that it was the work of mavericks like Feynman that defined 20th century science. Science of the past 50 years seems to be more defined by big projects than by big ideas.”
Two «axioms» in today’s research politics

• The larger the research group...

• ...and the larger the collaborative network

• ...the better the research (and the greater is societal relevance)
Why?

• Because will have access to expensive equipment and technology
  • Garbage in, garbage out rule

• Because it fosters strong leadership and management skills
  • But are these important skills for science?

• Because otherwise you risk not to be funded
  • True!

• Because history has shown that the greatest breakthroughs in science have always been in large research groups and collaborative networks
  • Has it?
The natural sciences

Galielo Galileo (1564 - 1642). Went against the prevailing opinions at the time, had to suffer personally.

Isac Newton (1642 - 1726). Theoretical work, based on empirical observation made, not known of large collaborating groups.

Albert Einstein (1879 - 1955). Nobel Prize (1921) Worked in a patent bureau, his work not immediately accepted by scientific community.
The life sciences

Charles Darwin (1809-1882) "Lonely wolf" going against the prevailing scientific/religious views, did his observations with help of a small group of assistants.


Francis Crick (1916 - 2004); James Watson (1928 -- ). Nobel Prize 1962. Two single collaborators, in tough "race to be the first«. Discovered the structure of the DNA in 1953.
The mind sciences

Ivan P. Pavlov 1849 - 1936
Nobel Prize 1905
Made his most famous discovery by accident, from observing the behavior of his laboratory dogs at meal-times.

Sigmund Freud 1856 - 1939
Had several disciples but was not engaged in formal research groups. Made his groundbreaking discoveries as a single researcher.

Daniel Kahnemman 1934 -- Nobel Prize 2002
Had a single collaborator, made ground-breaking experiments on "non-rational decisions», changed economic theory.
...aren’t there any examples in the history of science of large-scale collaborations making groundbreaking results....

The Manhattan Project, Los Alamos, USA, 1942 - 1945

- Interdisciplinarity
- Collaboration
- Strong leadership (**** General)
- Excellent management (military style)
Good luck with your proposal!