

CHESE @ PLATEAU @ SPLASH 2017



Can Some  
Programming Languages  
Be  
Considered Harmful?

S.Janssens · U.P.Schultz · V.Zaytsev

# Meet the ones responsible:



Edsger W. Dijkstra

—  
Computing pioneer and CS professor known for “his sandals, his beard and his ‘arrogance’ (whatever that may be).”  
([quotes](#))



Sabine Janssens

—  
MSc in clinical psychology, postgraduate studies in solution-focused cognitive and systemic therapy and coaching.  
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Ulrik Pagh Schultz

—  
Associate prof at U Southern Denmark, interested in programming languages for self-rebuilding / industrial / agricultural / flying robots.  
([homepage](#))



Vadim Zaytsev

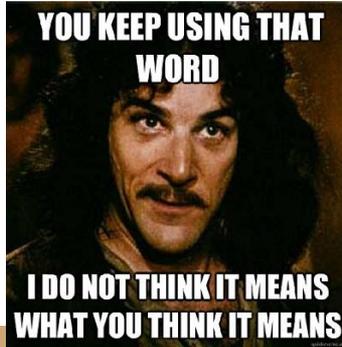
—  
CSO at Raincode Labs, expert in compilers, grammars and languages. Interests in language design.  
([homepage](#))

# Motivation and objectives

- Psychology and computer programming... a useful combination?
- Design affects user behaviour
  - cf. *Design with Intent* for non-software design
  - cf. MoDELS/SPLASH-I, DSLs supporting domain-specific ways of thinking
- But: can it “damage the mind”?
- Our interest: mental harm of any kind
  - beyond fleeting scares, frustrations and anxiety
- Current goal: outline of possible research questions
  - not yet practical implementation & operationalisation

# Plenty of cases

- <http://phpsadness.com>
- <http://depressedprogrammer.wordpress.com>
- “impossible to teach programming to students [exposed to] BASIC”
- “teaching of BASIC [...] mutilates the mind beyond recovery”
- “the use of COBOL cripples the mind”
- “I’ve tried a few times to give back to the [OSS] community [...] but my brain reminds me that I’m worthless and I end up giving up and slinking back into the dark matter.”



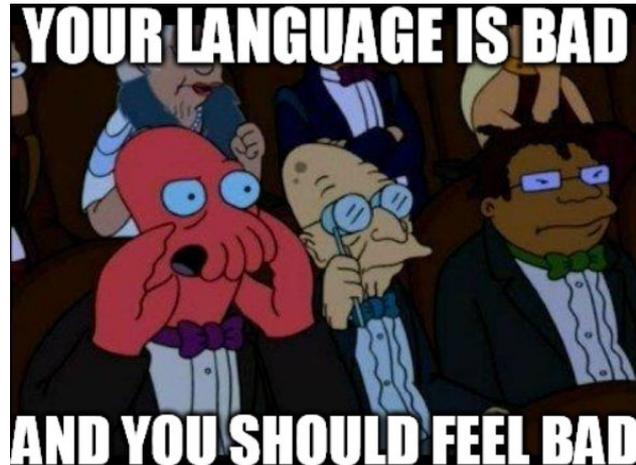
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- “I’ve tried a few times to give back to the [OSS] community [...] but my brain reminds me that I’m worthless and I end up giving up and slinking back into the dark matter.”
- “I have come to realize that I’m a terrible programmer. [...] I have tried to study and practice after work, but I am just way too exhausted after work to do anything productive. I am beginning to have nightmares”

# RQ0: Does using a language make you bad?

- *Question: does using a particular software language make programmers write bad programs?*
- Feasible experimentally? Yes!

**Not the kind of question we're looking for!**



# RQ1: What changes in the code with mental state

- *Question: what are noticeable differences between the code written by programmers in different mental states?*
  - The use of language changes according to the mental state
  - Example : depressed people use more negative words and "I"\*
- Feasible experimentally?
  - Setup: mood priming and construct activation\*\*
  - Task: write a piece of code
  - Threats to validity: unknown initial state of mind
    - mitigate using standardised writing assignments



# RQ2: Can a language change your mental state?

- *Question: is working in a particular language capable of making a programmer less happy or even depressed?*
  - Direct effect: use of idioms has effect on mental state \*
  - Focus determines perception: “what is red?”\*\*
  - Elements that resemble natural language are bound to the same rules
  - More resemblance with natural languages implies stronger effect
  - Indirect/ long term effects of a language: career, ability to learn\*
- Feasible experimentally?
  - Mining software repositories for text + natural language processing
  - Collect representative texts (documentation, libraries, discussions,... )
  - Look for patterns that indicate certain mental states in the use of natural languages



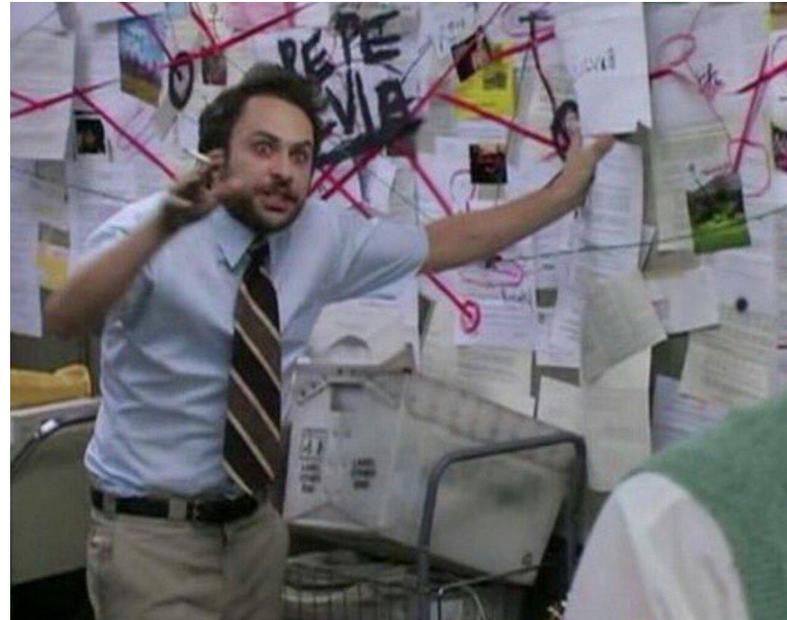
# RQ3: Does knowing a language cause direct harm?

- *Question: does knowing a particular language cause direct harm in the sense of making a person a worse programmer?*
  - Does knowledge of one language impede further learning
  - Conditioning principles:
    - learned helplessness (Martin Seligman) \*
    - harder to unlearn than to learn for the first time\*\*
- Feasible experimentally?
  - Use a large body of code: FLOSS
  - Collect information about open source developers (language + analysis of code)
  - This method has worked for gender diversity, social diversity, developer turnover, etc



# RQ4: Does knowing a language cause indirect harm?

- *Question: does knowing a particular language make a person worse in communicating ideas and collaborating with others in the context of software creation?*
  - Programming is a social activity
  - Isolation and perfectionism lead to depression
  - Do not think about what you will have for lunch\*
- Feasible experimentally?
  - Similar design as for RQ3
  - Search patterns and habits in collaboration
  - More negativity towards close coworkers, less negativity to outsiders (prior research).



# RQ5: Does the first language matter?



- *Question: can the first programming language learnt by a programmer, have any long-term effects like preventing the programmer to learn and effectively use new constructions and abstractions?*
  - Similarly to the importance of “the first” for relationship satisfaction & career?
- Feasible experimentally?
  - Use questionnaires to find out first language
  - Analysis of code and information about career
  - Measure inter-assessor reliability of blind judges to rule out possible biases

# Future plans

- Defining the confounding factors
  - For instance, what if being depressed or having in a particular state of mind, has direct influence on the choice of the language?
  - Analysis of relevant research in the domain of psychology will help to identify these
- Pilot studies
  - in-depth interviews to refine interviews, test tools and identify relevant domains\*
- Refine and operationalize research questions
- Conduct experiments and analyze results\*\*

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