

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.
([homepage](#))



Ulrik Pagh Schultz

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



Vadim Zaytsev

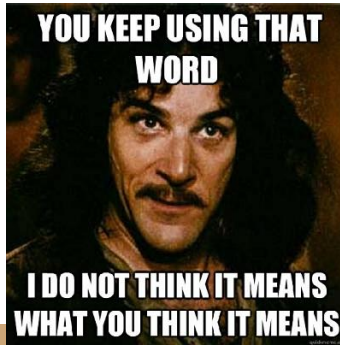
CSO at Raincode Labs, expert in compilers, grammars and languages. Interests in language design.
([homepage](#))

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.”



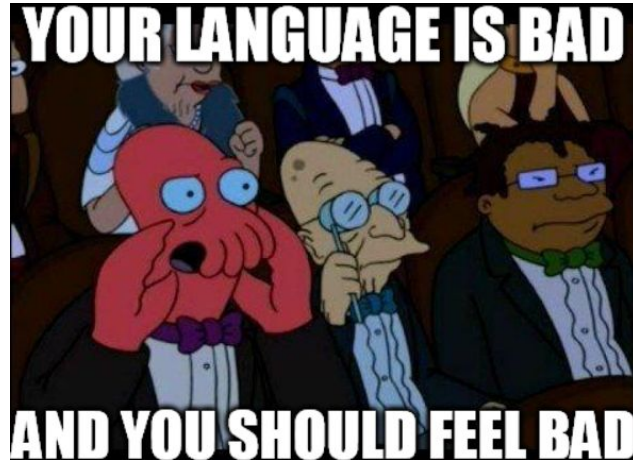
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- “I’ve tried a few times to give back to the [OSS] community [...] but my brain reminds me that I’m worthless and I end up giving up and slinking back into the dark matter.”
- “I have come to realize that I’m a terrible programmer. [...] I have tried 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



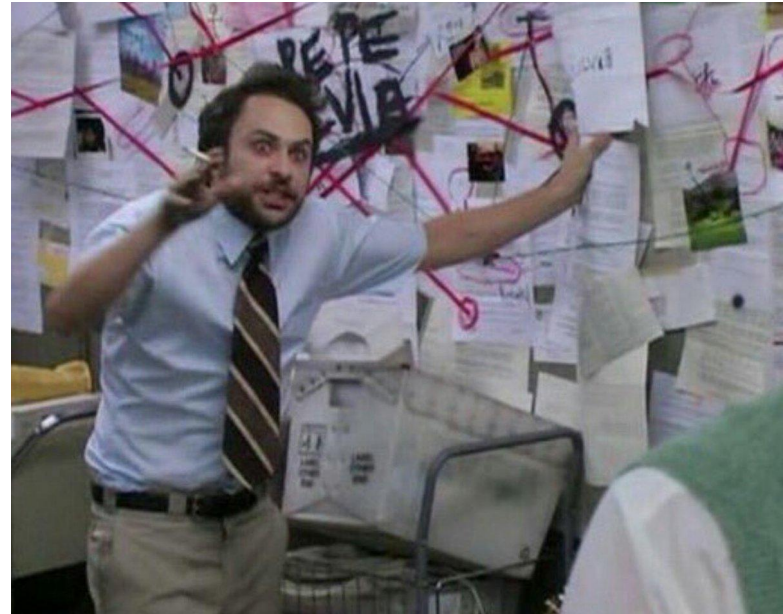
RQ3: Does knowing a language cause direct harm?

- *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**

Credit:

- https://commons.wikimedia.org/wiki/File:Gordon_Ramsay_cheese_plate.JPG [CC-BY-SA, Tzahy Lerner, 2005]
- https://commons.wikimedia.org/wiki/File:Edsger_Wybe_Dijkstra.jpg [CC-BY-SA, Hamilton Richards, 2002]