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Open Science Tools

Open-source, but paying the bills: PsychoPy's story

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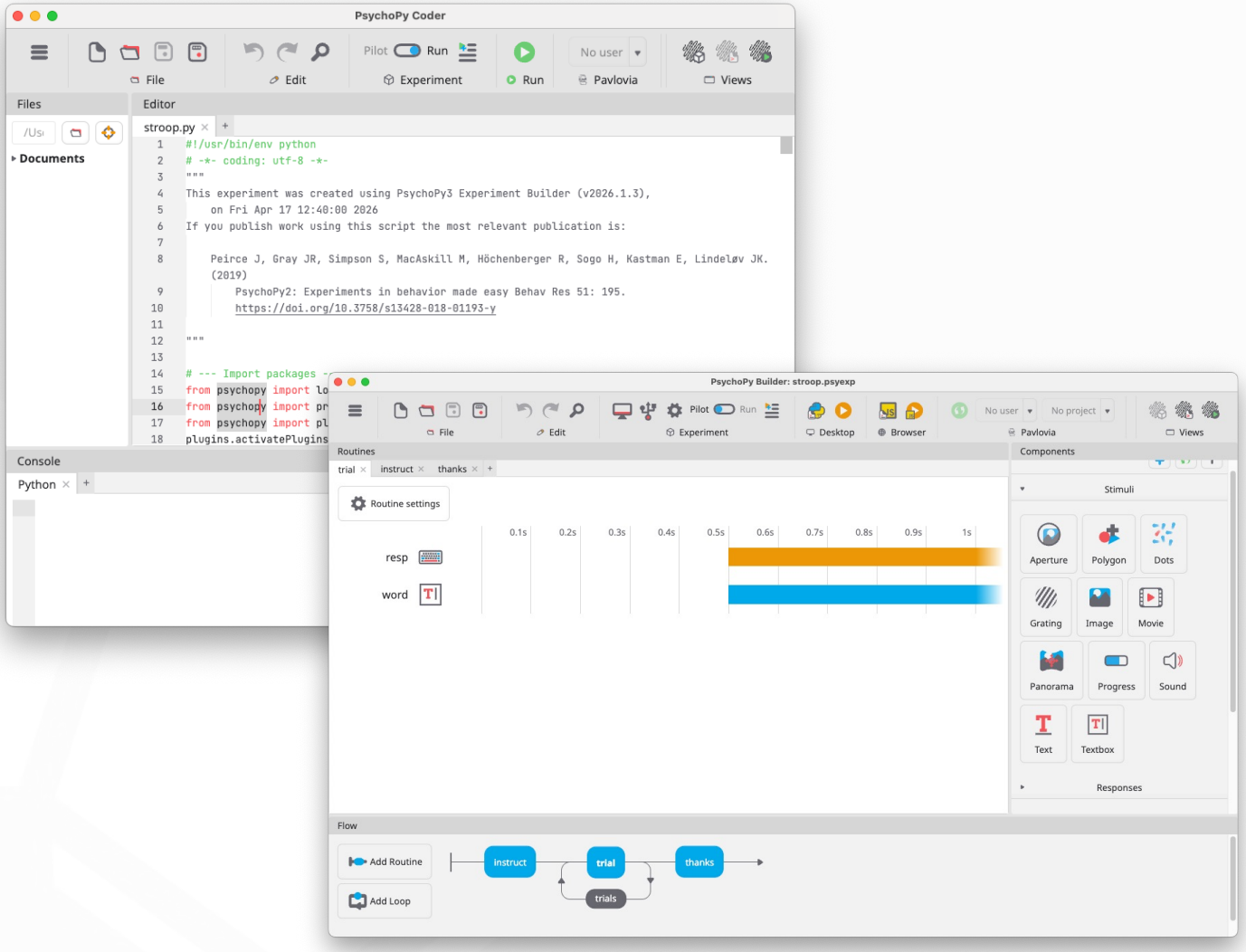
Who am I?

A psychologist/neuroscientist

No formal Comp Sci education

...but with a passion for tech and "methods"

Best known for creating PsychoPy, and the subsequent ecosystem around it



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Overview

- Academia needs tools, and we believe in open-source
- Open-Source Software lifecycle, from "baby" to "grown-up”
- Sustainable business models for tool development

(Feel free to ask questions at any time)

Why do this?

I think most RSEs (and most open-source devs) are in it because:

- Researchers need tools, and the tools are often quite specialized. We need things we can adapt.
- Researchers are passionate about how the tool should work. We have an itch and we can’t help scratching it!
- Open-source software (OSS) dev feels like a good fit for research.
- *But* do think about whether you can help/adapt an existing project.

Why do this?

Does it help your career in academia, especially if you wrote a well-known package?

Unfortunately:

- It typically takes a long time for a package to reach the levels of uptake needed to sustain itself
- Tool development is poorly viewed/resourced in the sector
- Free to use ≠ free to write

OSS lifecycle 1: baby

(PsychoPy 2002-2005)

(Often cute, but maybe not “useful”)

Create your project and make public (on GitHub or GitLab)

- Try to choose a name that people can google!
- Populate with license (MIT or GPL?)
- Write easy documentation, at least an "Install" guide

Considerations:

- Is there really a need? Is this solution a general tool or just for your lab?
- Could this extend an existing package? Users prefer a few packages that do more, not lots of packages for a single thing

Work:

- Minimal, can be a hobby

OSS lifecycle 2: early growth

(PsychoPy 2002-2010: grew to ~1000 users)

(when your toddler climbs into the cupboard)

Hopefully, you'll grow organically, in users *and* contributors

- **No rush.** More users = more time supporting
- **But are numbers growing?** Are people searching for this thing? If not, why not?
- **Do start tracking** usage if possible (downloads? documentation analytics? usage stats?)
- **Need** good docs and good dev practices (e.g. test suites)

Work:

- Purely volunteer-based, but you can choose how much effort to put in
- Busy but fun!

Exits:

- A lot of projects don't "take off" and whither

OSS lifecycle 3: maturing

(PsychoPy 2010-2017 went 1,000→18,000 users)

(time to try on earrings)

At critical mass, you get known and grow faster

- **But** user expectations from a "mature" package are different

Work:

- As users grow your commitment must grow
- But nobody is paying you and not clear that academic colleagues "get it”
- The hobby is getting stressful!
- Free to use ≠ free to write

Exits:

- A lot of primary developers get too tired/busy at this point and quit
- Did your contributor team grow enough to cope with that?
- What is your Bus Factor?

OSS lifecycle 4: financial sustainability

(Jon circa 2001, reaching his personal financial sustainability)

At some point we hopefully "mature" enough that we can become more than a hobby. Then we need real funding.

For OSS that can be tricky:

- ❌ Requesting donations, or advertising, doesn't really work
- ❌ Charge a maintenance fee (people still don’t pay)
- ❌ Grants are great (but rare and usually short-term)

Exits:

Most OSS packages never really secure a long-term funding stream. That makes "succession" hard to plan

OSS lifecycle 4: financial sustainability

At some point it's time to model some numbers

	Users that need	Avg per user
Workshops	0.1%	£300
Services & "pro" features	10%	£100
Consultancy	0.1%	£2,000

n=1000	**n=15000**	**n=45000**
£300	£4,500	£13,500
£10,000	£150,000	£450,000
£2,000	£30,000	£90,000

In OSS, these numbers are likely relatively small

...but these can get big

Intellectual property and ownership

How to manage money when generating revenue?

The institution paying probably owns the IP, BUT if your code is open source

they can't stop you *using it*

Models for IP and ownership (talk to your commercialization office):

- Run within the university (as an account code)
- University "spin-out" (often 51% owned by the university)
- Independent "start-up" that pays a royalty for use of the license

How did PsychoPy get there?

2002: Created on sourceforge

... many gradual developments

2013: First annual workshop (21 attendees)

2017-19: Grant to build pavlovia.org (hosting service)

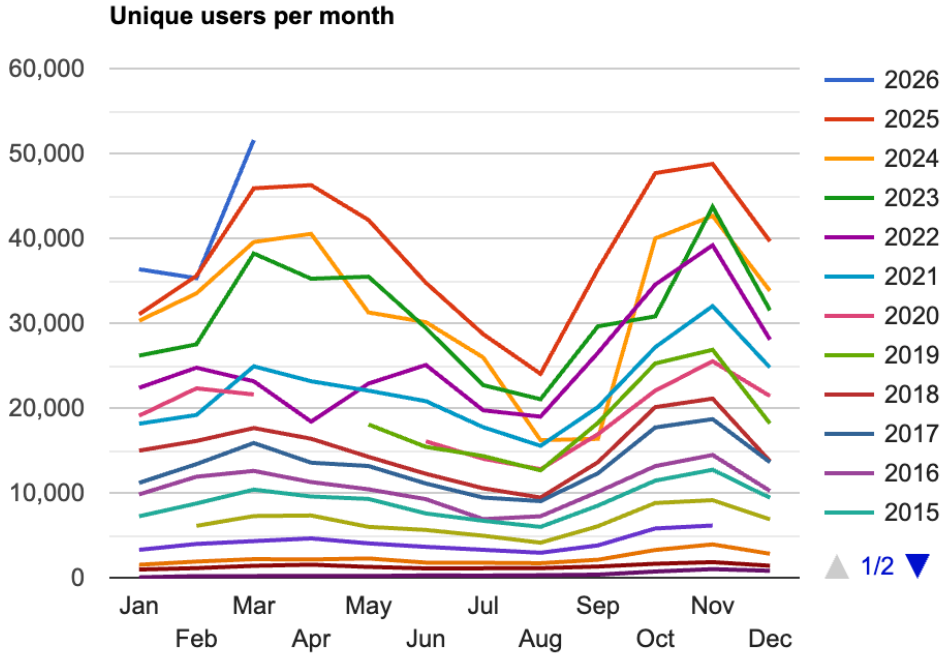
2019: Open Science Tools Ltd. Incorporated, Pavlovia launched

(2020 COVID!)

2020: 4 staff (maintaining the software but also running training)

2021: started adding consultancy services

2025: now 3 scientists, 4 developers, and 2 admin staff



PsychoPy monthly active users

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Take home messages

Sustainable business models for OSS are *possible*

They require a large userbase (but OSS can result in a large userbase)

Getting there can be long, hard, and requires a fair does of good luck

Questions?