# PsychoPy:反应盒精确记时/Cedrus Box

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# 反应盒与键盘Response box vs. keyboard

## 两者的反应时精度的差异

## 2-3ms vs. 10-12ms

" Get 2-3 millisecond RT resolution. The resolution of a USB keyboard driver is 10-12ms and the hardware could make it worse."

https://www.cedrus.com/rb_series/index.htm

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**Table 2**   Descriptive statistics for RTs and accuracy, aggregated by participants

| Set Size | Response Box | | | Keyboard | | | Web From Lab | | | Web From Home | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 4 | 6 | 2 | 4 | 6 | 2 | 4 | 6 | 2 | 4 | 6 |
| RT mean | 319 | 473 | 535 | 378 | 524 | 565 | 443 | 577 | 614 | 429 | 545 | 608 |
| RT *SD* | 66 | 114 | 78 | 60 | 94 | 46 | 133 | 215 | 105 | 72 | 94 | 87 |
| Share of errors | 4.3 | 6.0 | 6.4 | 2.5 | 3.8 | 5.1 | 3.7 | 4.5 | 5.4 | 4.0 | 5.2 | 6.2 |

Source: Plant, R. R. (2016).
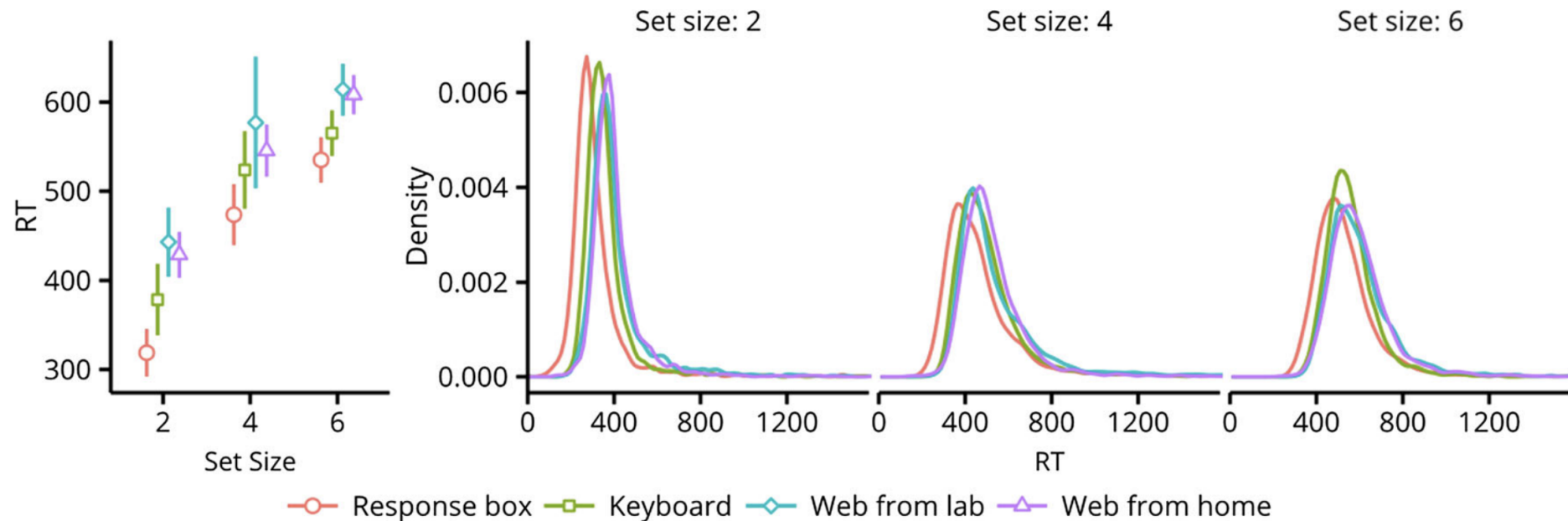
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**Fig.2** Means (left panel) and distributions (right panel) of response times (RTs, in ms). Lines in the left panel show 95 % confidence intervals, controlling for between-subjects variability (Cousineau, 2005; Morey, 2008)
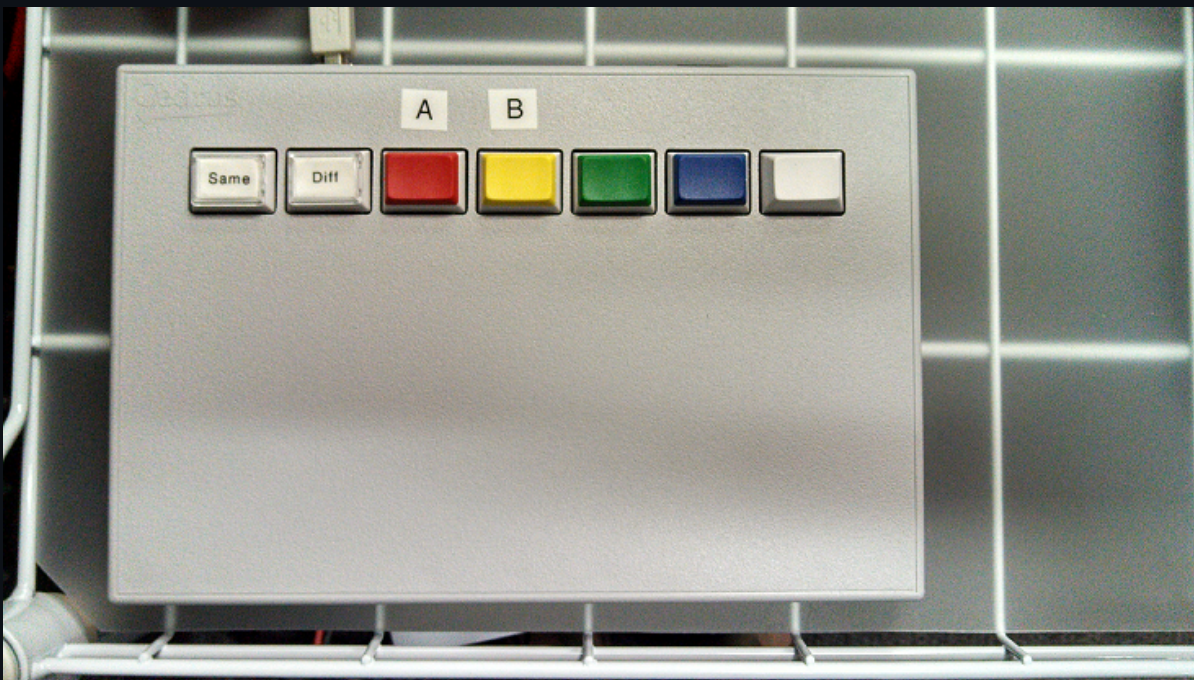
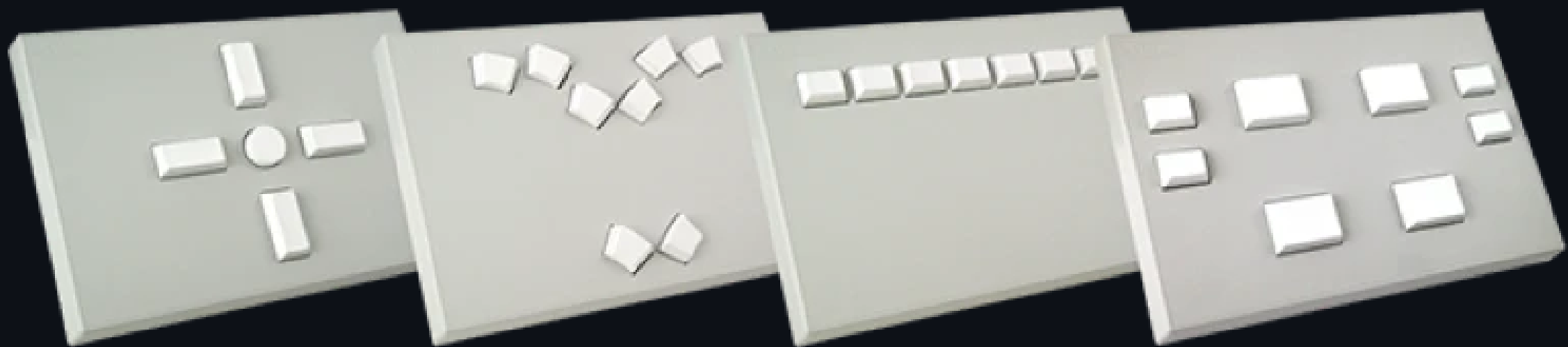Source: Plant, R. R. (2016).

# 反应盒的类型

- Cedrus box (supported by PsychoPy)
- SRBox (for Eprime)

# Cedrus 反应盒

- Cedrus 7-button response pad

# Cedrus 反应盒

# Cedrus 安装驱动

## INSTALLING AN RB SERIES PAD

The RB-x40 generation response pads introduce a new Keyboard mode. For better timing, experimental software like SuperLab use Standard mode instead and need to have a USB driver installed:

- Installing the USB Driver for Mac OS X
- Installing the USB Driver for Windows
- Installing the USB Driver for Linux

## https://ftdichip.com/drivers/d2xx-drivers/

# Cedrus 提供的PsychoPy示例代码

https://cedrus.com/support/rb_series/tn1551_psychopy.htm

```python
import pyxid2
import time

# get a list of all attached XID devices
devices = pyxid2.get_xid_devices()

dev = devices[0] # get the first device to use
print(dev)
dev.reset_base_timer()
dev.reset_rt_timer()

#dev._send_command('iuA1', 0)
#dev.enable_usb_output('K', True)

if dev.is_response_device():
    print ("Press a key!")
    while not dev.has_response():
        dev.poll_for_response()

    response = dev.get_next_response()
    print(response)
    dev.clear_response_queue()

dev.set_pulse_duration(300)

sleep_flash = .3
for bm in range(0, 16):
    mask = 2 ** bm
    print("activate_line bitmask: ", mask)
    #dev.activate_line(lines=[1,3,5,7,9,11,13,15])
    dev.activate_line(bitmask=mask)
    time.sleep(sleep_flash)
```
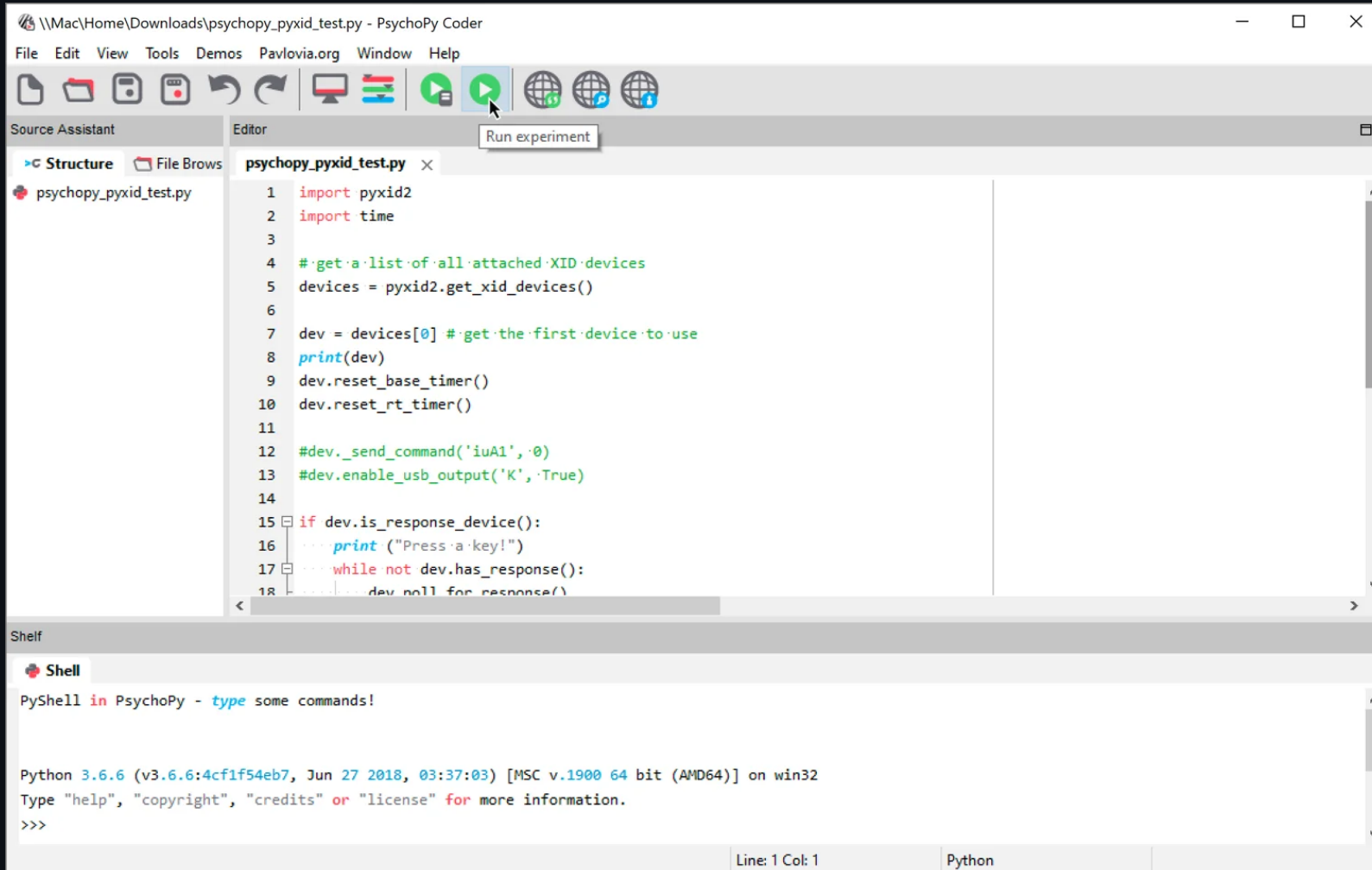
# Run Cedrus box for PSYCHOPY in WINDOWS

# 示例代码得到Cedrus box反应时

```python
import pyxid2 as pyxid

# get a list of all attached XID devices
devices = pyxid.get_xid_devices()

dev = devices[0] # get the first device to use
if dev.is_response_device():
    dev.reset_base_timer()
    dev.reset_rt_timer()

    while True:
        dev.poll_for_response()
        if dev.response_queue_size() > 0:
            response = dev.get_next_response()
            # do something with the response
```

# How to Cite Cedrus Box in your paper?

"The experiment was run on a Windows 7 PC. In the odor identification and rating tasks, participants responded with the mouse. In the categorization task, they responded with a Cedrus RB-740 Response Box (Cedrus Corporation)."

Source: Thomas Hörberg, et al.(2020)

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## 使用反应盒的参考论文:

Thomas Hörberg, Maria Larsson, Ingrid Ekström, Camilla Sandöy, Peter Lundén, Jonas K Olofsson, Olfactory Influences on Visual Categorization: Behavioral and ERP Evidence, Cerebral Cortex, Volume 30, Issue 7, July 2020, Pages 4220–4237, https://doi.org/10.1093/cercor/bhaa050

# 精确计时参考文献

Plant, R. R. (2016). A reminder on millisecond timing accuracy and potential replication failure in computer-based psychology experiments: An open letter. Behavior Research Methods, 48(1), 408-411.

# References:

## PsychoPy

- https://www.psychopy.org/api/hardware/cedrus.html

## Cedrus

- https://github.com/cedrus-opensource/pyxid

- https://cedrus.com/support/rb_series/index.htm

- https://cedrus.com/support/rb_series/tn1551_psychopy.htm

- https://phon.wordpress.ncsu.edu/lab-manual/perception-experiments/