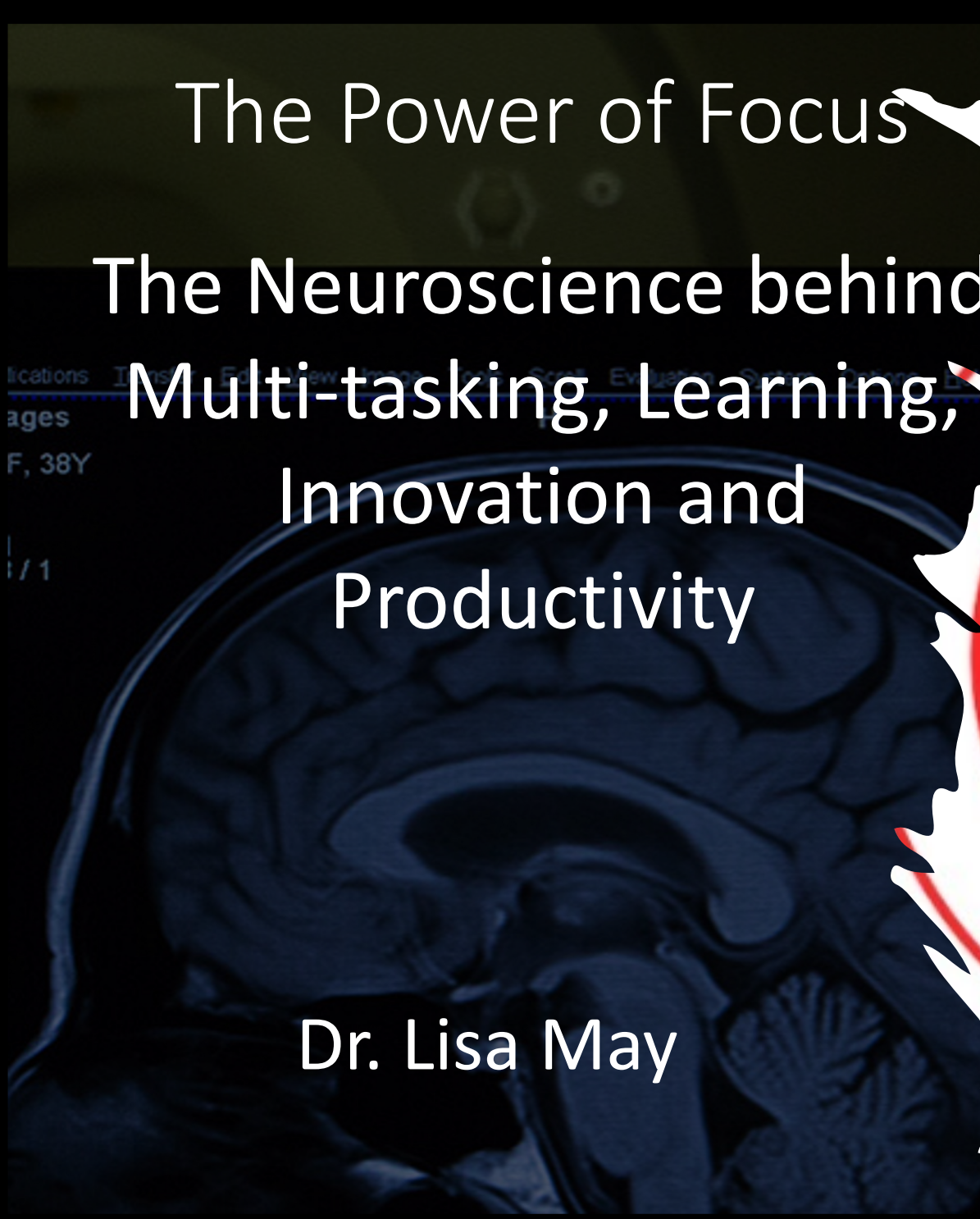
The Power of Focus

The Neuroscience behind Multi-tasking, Learning, Innovation and Productivity



Dr. Lisa May

applied scrum®

The Power of Focus: the Neuroscience Behind Multitasking, Learning, Innovation, and Productivity

Lisa May, PhD ACSM CSPO

Lisa May, PhD
ACSM CSPO

- "Workflow Coach" (Agile Coach) at Posit
- Social & Affective Neuroscientist
  - PhD in 2017 from University of Oregon
  - Motivation & Behavior Change
  - Value: How can basic science be useful?

The Power of Focus: the Neuroscience Behind Multitasking, Learning, Innovation, and Productivity

Outline

- Multi-tasking, task switching, and the costs associated
- Neuroscience of task switching
- Evidence-based strategies to reduce impact of task switching on learning, innovation, and productivity

The Power of Focus: the Neuroscience Behind Multitasking, Learning, Innovation, and Productivity

Outline

- Multi-tasking, task switching, and the costs associated
- Neuroscience of task switching
- Evidence-based strategies to reduce impact of task switching on learning, innovation, and productivity

Multitasking

Our brains don't really multi-task. We only focus on one thing at a time. What we think of as multi-tasking is just switching back and forth between tasks quickly.

Strobach, T., Liepelt, R., Schubert, T., & Kiesel, A. (2012). Task switching: Effects of practice on switch and mixing costs. Psychological Research, 76(1), 74–83. https://doi.org/10.1007/s00426-011-0323-x

Wylie, G., & Allport, A. (2000). Task switching and the measurement of "switch costs." Psychological Research, 63(3–4), 212–233. https://doi.org/10.1007/s004269900003

Multitasking

Switch costs:

- Reduced speed
- Reduced accuracy
- Reduced learning/memory encoding

If it's costly, why do we find ourselves naturally doing it?

Strobach, T., Liepelt, R., Schubert, T., & Kiesel, A. (2012). Task switching: Effects of practice on switch and mixing costs. Psychological Research, 76(1), 74–83. https://doi.org/10.1007/s00426-011-0323-x

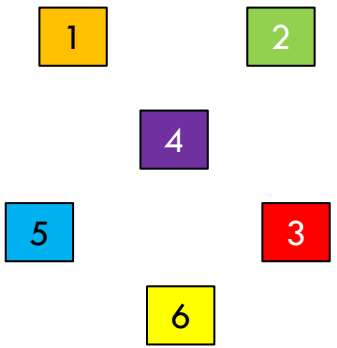
Wylie, G., & Allport, A. (2000). Task switching and the measurement of "switch costs." Psychological Research, 63(3–4), 212–233. https://doi.org/10.1007/s004269900003

This Talk

- Review of scientific literature
- Focus on validated, replicated, consistent results
- Highlight themes that generalize to real-life situations

LAB TASK EXAMPLE

Unorganized



Organize by Number

Organize by Color

LAB TASK EXAMPLE

Organize by Number

Switch costs:
Reduced speed
Reduced accuracy
Reduced learning/memory encoding

Organize by Color

Characteristics of a "good" lab task:

- Controls for everything but the variable of interest
- Easy to run various permutations
- Easy and cheap to run a lot of participants

The Power of Focus: the Neuroscience Behind Multitasking, Learning, Innovation, and Productivity

Outline

- Multi-tasking, task switching, and the costs associated
- Neuroscience of task switching
- Evidence-based strategies to reduce impact of task switching on learning, innovation, and productivity

Neuroscience of Task Switching

Why do we even need the neuroscience results?

Attention Residue & Proactive Inhibition

1. Time needed to inhibit previous task set
2. Residual activation of previous task set
3. Inhibition of previous task set delays return

Organize by Number

1
2
3
4
5
6

Organize by Color

3
1
6
2
5
4

Kieffaber, P. D., & Hetrick, W. P. (2005). Event-related potential correlates of task switching and switch costs, *42*, 56–71. https://doi.org/10.1111/j.1469-8986.2005.00262.x
Koch, I., Gade, M., Schuch, S., & Philipp, A. M. (2010). The role of inhibition in task switching: A review. *Psychonomic Bulletin and Review*, *17*(1), 1–14. https://doi.org/10.3758/PBR.17.1.1

The Power of Focus: the Neuroscience Behind Multitasking, Learning, Innovation, and Productivity

Outline

- Multi-tasking, task switching, and the costs associated
- Neuroscience of task switching
- Evidence-based strategies to reduce impact of task switching on learning, innovation, and productivity

Discussion

Share in the chat:

What challenges with task switching do you and your teams encounter?

How does task switching impact you and your teams' work?

This Talk

- Review of scientific literature
  - Cited 1 – 2 studies I think might be useful.
- Focus on validated, replicated, consistent results
- Highlight themes that generalize to real-life situations.
- Mostly generalized from timescale of milliseconds or seconds. Be wary of claims at week/team level.

1. Provide structure in attention management

Fitz, N., Kushlev, K., Jagannathan, R., Lewis, T., Paliwal, D., & Ariely, D. (2019). Batching smartphone notifications can improve well-being. *Computers in Human Behavior*, *101*, 84–94. https://doi.org/10.1016/j.chb.2019.07.016

https://francescocirillo.com/pages/pomodoro-technique

https://www.collaborationsuperpowers.com/42-how-to-create-a-team-agreement-for-your-remote-team/

2. Provide consistency

Koch, I., Gade, M., Schuch, S., & Philipp, A. M. (2010). The role of inhibition in task switching: A review. *Psychonomic Bulletin and Review*, *17*(1), 1–14. https://doi.org/10.3758/PBR.17.1.1

3. Provide advance notice

Aufschnaiter, S., Kiesel, A., Dreisbach, G., Wenke, D., & Thomaschke, R. (2018). Time-based expectancy in temporally structured task switching. *Journal of Experimental Psychology: Human Perception and Performance*, *44*(6), 856–870. https://doi.org/10.1037/xhp0000494

Ruge, H., Brass, M., Koch, I., Rubin, O., Meiran, N., & Cramon, D. Y. von. (2005). Advance preparation and stimulus-induced interference in cued task switching: further insights from BOLD fMRI. *Neuropsychologia*, *43*(3), 340–355. https://doi.org/10.1016/j.neuropsychologia.2004.06.014

4. Provide a reason to help people cognitively disengage

Leroy, S., & Schmidt, A. M. (2016). The effect of regulatory focus on attention residue and performance during interruptions. *Organizational Behavior and Human Decision Processes, 137*, 218–235. https://doi.org/10.1016/j.obhdp.2016.07.006

5. Communicate progress, endpoint, and/or deadline

Kanfer, R., & Ackerman, P. L. (1989). Motivation and cognitive abilities: An integrative/aptitude-treatment interaction approach to skill acquisition. *Journal of Applied Psychology*, *74*(4), 657–690. https://doi.org/10.1037/0021-9010.74.4.657

6. Avoid time pressure to resume the interrupted task

Leroy, S., & Glomb, T. M. (2018). Tasks interrupted: How anticipating time pressure on resumption of an interrupted task causes attention residue and low performance on interrupting tasks and how a “ready-to-resume” plan mitigates the effects. *Organization Science*, *29*(3), 380–397. https://doi.org/10.1287/orsc.2017.1184

7. Provide completeness

Newton, D. W., LePine, J. A., Kim, J. K., Wellman, N., & Bush, J. T. (2019). Taking Engagement to Task: The Nature and Functioning of Task Engagement Across Transitions. *Journal of Applied Psychology*, *105*(1), 1–18. https://doi.org/10.1037/apl0000428

8. Protect Learning

Muhmenthaler, M. C., & Meier, B. (2019). Task Switching Hurts Memory Encoding. *Experimental Psychology*, *66*(1), 58–67. https://doi.org/10.1027/1618-3169/a000431

9. Create a positive emotional environment

Kanfer, R., & Ackerman, P. L. (1989). Motivation and cognitive abilities: An integrative/aptitude-treatment interaction approach to skill acquisition. *Journal of Applied Psychology*, *74*(4), 657–690. https://doi.org/10.1037/0021-9010.74.4.657

Kuhl, J., & Koch, B. (1984). Motivational determinants of motor performance: The hidden second task. *Psychological Research*, *46*(1–2), 143–153.

10. Incubation ≠ switching

Dresler, M., Sandberg, A., Ohla, K., Bublitz, C., Trenado, C., Mroczko-Wąsowicz, A., … Repantis, D. (2013). Non-pharmacological cognitive enhancement. *Neuropharmacology*, *64*(1), 529–543. https://doi.org/10.1016/j.neuropharm.2012.07.002

Gilhooly, K. J. (2016). Incubation and Intuition in Creative Problem Solving. *Frontiers in Psychology*, *7*. https://doi.org/10.3389/fpsyg.2016.01076

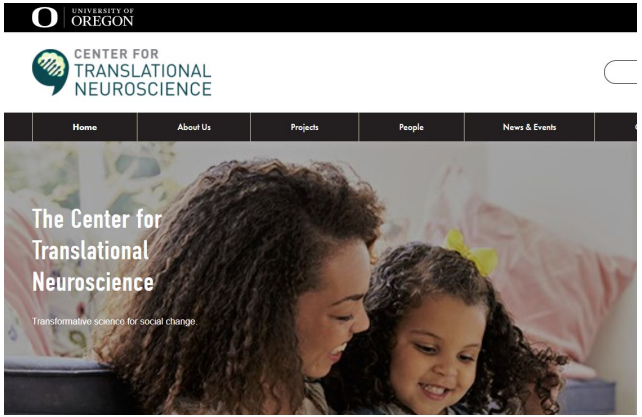
Ritter, S. M., & Dijksterhuis, A. (2014). Creativity: "the unconscious foundations of the incubation period. *Frontiers in Human Neuroscience*, *8*. https://doi.org/10.3389/fnhum.2014.00215

The Power of Focus: the Neuroscience Behind Multitasking, Learning, Innovation, and Productivity

- Multi-tasking, task switching, and the costs associated
- Neuroscience of task switching
- 10 Evidence-based strategies to reduce impact of task switching on learning, innovation, and productivity
  1. Provide structure in attention management
  2. Provide consistency
  3. Provide advance notice
  4. Provide a reason to help people cognitively disengage
  5. Communicate progress, endpoint, and/or deadline
  6. Avoid time pressure to resume the interrupted task
  7. Provide completeness
  8. Protect Learning
  9. Create a positive emotional environment
  10. Incubation ≠ switching

THANKS

Tamara Runyon, CST



Center for Translational Neuroscience at the University of Oregon

Breakout discussion

What strategies for reducing the impact of task switching on learning, innovation, and productivity have you tried or seen tried? Was the attempt successful?

What tactics discussed today interest you the most? How could you apply this information to your environment?

1. Provide structure in attention management
2. Provide consistency
3. Provide advance notice
4. Provide a reason to help people cognitively disengage
5. Communicate progress, endpoint, and/or deadline
6. Avoid time pressure to resume the interrupted task
7. Provide completeness
8. Protect Learning
9. Create a positive emotional environment
10. Incubation ≠ switching

We hope you have enjoyed this Applied Scrum Webinar series presentation on "The Power Of Focus" with Dr. Lisa May!

If you would like to be notified of future webinars and other Applied Scrum learning events, sign up at:

www.appliedscrum.com/subscribe