

Episode 26: To Switch or Not to Switch! (But not that type of Switch)

Show Notes

Multi-tasking happens a lot. We're in a meeting, we email. We watch TV, we text. And to the chagrin of many, we play a game with our friends, we scroll through social media. What does cognitive psychology have to say about doing multiple things at once?

Game References

Flux, Rise of Fenris, Scythe, Stay Cool, What Remains of Edith Finch

Research References

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Transcript

Hello! This is Episode 26 of the Cognitive Gamer podcast. I am your host, Dr. Stephen Blessing, a professor of psychology at the University of Tampa. I use games to both explain and explore concepts in psychology, particularly cognitive psychology. I know it's a pet peeve of many to be playing a game and have one of your fellow players doing something besides paying attention to the game. Maybe they are on their phone, watching TV, or carrying on a conversation with non-players. It annoys me as well, and today I would like to take a closer look at what it means to switch back and forth between tasks like this. (Sorry, I couldn't resist using that sound effect once. I'll stop.) Often times the other person will say I'm still paying attention, but in your heart of hearts, you know that's not true. And, in this case, cognitive science is on your side. There is essentially always a cost when someone tries to do two meaningful tasks at once, and they need to switch their attention back and forth between the two different tasks.

There are a few different psychological ways to consider this issue of switching tasks, but I don't want to get too off into the weeds here. There are some interesting, subtle differences as to where the main issue might lie with regards to attention and task switching, but we'll stay relatively high level, at least for this conversation. The main concept here is attention, something that we have considered before, way back in Episode 3. If you remember, I mentioned a couple of different metaphors that are used to describe attention, such as the capacity theory of attention. That's the notion that we only have a limited supply of attention to give to tasks, and once that attention is used up, we will begin to lose incoming information. The English idiom to "pay attention" is quite apt here, because whenever you attend to some incoming information, you have to give up some of that precious attention in order to process what this new information is all about. How much attention you have to pay is modulated by how easy or difficult the task may be, and how much practice you have had with the task. Easy tasks that you have done a lot require almost no attention, whereas difficult tasks that you have little practice at will require almost all of your attention.

To get back to our topic of doing multiple tasks at once, this is why your grandma can knit and watch TV or carry on a conversation with seemingly little interference doing either task. Knitting is so well-practiced for her that it takes very little of her attention, such that she can attend to the conversation going on around her. But, texting or looking at social media by their nature will always require a certain amount of your attention in order to process properly, and will almost always interfere with your ability to attend to another task at the same time.

I was reminded of this topic by listening to a recent Shut Up and Sit Down podcast where Matt and Quinns were talking about a to-be-released game called Stay Cool by designer Julien Sentis. In the game, the current, active player must do two things at once. This player will be asked questions by the players to both their left and right. The active player must answer verbally the questions being asked by the player to the left, and use cubes with letters on each side to make words to answer the questions coming from their right. This is of course being done under a time limit. And, on subsequent rounds, the active player must also attend to the sand timer themselves. None of the questions are too hard, but from the description and listening to Matt and Quinns describe their interaction with the game, you can imagine how difficult it is to play. Indeed, this is a psych experiment in the making. A psychologist might call this a dual-task experiment, as the player needs to attend to two things at the same time. And, because they are being bombarded by two different messages, it's a dichotic listening experiment. And lastly, they are being asked to respond in two different modalities, both verbally and by manipulation of these cubes. It sounds like an awesome experiment; I mean game...

Let's concentrate on the fact that the player is doing two things at once in Stay Cool, both of which are answering questions, but in one case they are verbally answering the question and in the other they are manipulating cubes in order to spell out a word. Harold Pashler is a big name in psychology for studying how people behave in these dual task situations. Given the easy nature of the questions, like how many legs does a spider have, either task by itself would not be too hard. But, by putting them together, both tasks done simultaneously will take longer, and because I believe they are clever in the questions they are asking much longer, than doing the tasks separately. This difference in time, between doing one task by itself versus doing that task in the presence of the secondary task is called the switch cost. And this is what raises our hackles

when we see one of our fellow players as they check their phone during a game. We know that this switch in attention is going to cause the game to slow down. And it does. There is almost always a switch cost, particularly between two tasks that can never truly be automatic, such as attending to a text message and playing a game. And of course this plays out in the real world with texting and driving—another thing that the research clearly shows you shouldn't do. A lot of applied work has been done in this area, not just with texting and driving but also with air traffic controllers and how they do their job. I'll link in the show notes some articles about both of these issues, if you are interested in this literature.

In the last episode I mentioned the video game *What Remains of Edith Finch*, where you find out all of this information about the Finch family. In one segment, the one about Lewis Finch, you are doing a dual task. With the left stick of the controller you are navigating a maze, and with the right stick you are cutting off fish heads. Again, neither task by itself is hard, but the fact that you have to do both at the same time in order to progress in the story and game makes it a bit more challenging. Though as I said in the last episode, it makes for a very remarkable and memorable experience.

There's a smallish, though interesting, attentional phenomenon that's related here I would like to mention, attentional blink. First, I like the name, attentional blink, because I think it describes the phenomenon quite well in a nutshell, and second, I have heard an interview with my favorite singer, song-writer Paul Simon in which he describes attentional blink in a very real sense within his area of expertise. When Paul has an important lyric in a song, one he knows you need to pay attention to in order to process, he will follow it up with a non-important lyric or a series of nonsense words, because he knows that you are still processing the first lyric. And that's the notion of attentional blink, that when something surprising happens or that requires additional attention, it's going to reduce your ability to attend to what comes after. A type of switch cost, in other words. One can imagine that happening in *Stay Cool*, that once you answer a question, your ability to attend to the next question will diminish after that excitement. And, this happens in many different game settings, both board games and video games. Anytime you've caught something out of the corner of your eye, or ear perhaps, that's going to draw your attention to it, increasing the probability you'll miss something that might happen immediately after.

As I said up top, there are a few different ways to consider this topic of task switching. What I've talked about so far is pretty standard fare in an intro to cognitive psych text, in terms of thinking about doing dual tasks. A term I've seen in other areas of psychology is cognitive flexibility, which encompasses not only this idea but more in general the notion of being able to attend and switch back and forth between different tasks and thinking about multiple concepts at once. When used in this way, one also sometimes sees the terms task switching versus cognitive switching, which is a distinction made between when you are unconsciously switching tasks, which is task switching, versus when you are consciously switching tasks, which is the term cognitive switching. For our purposes here, I'm not going to worry so much about that distinction. So, apologies if that's an important difference for you! Regardless, though, both are what are referred to as executive functioning of the brain, which requires planning, sequencing, and decision making. The front part of your brain, your frontal lobe, is responsible for this type of thinking. Tasks that require various types of task switching, then, are often used to diagnose brain damage that results in loss of executive functioning.

A very common experimental task that is used in this context is referred to as the Wisconsin Card Sorting Task. I found an on-line version of the task that I will link to in the show notes if you want to try it out yourself. The Wisconsin part of the name is because David Grant and Estabrook at the University of Wisconsin first wrote about it, back in 1948. And, indeed, as advertised, it's a card sorting task. The cards have different basic shapes on them, like stars, circles, and plus signs. There can be from 1-4 of the same symbol on each card, and the symbols can be of different colors. The researcher puts 4 cards face up on the table and hands the participant a fifth card. The participant has to put their card next to the card on the table that it should be sorted with, either based on shape, symbol, or number. But, the participant doesn't know the rule the researcher is using to group like symbols. That's part of the point of the task—you have to induce the rule. So, maybe you place your red circle next to a card that has two blue circles on it. "Wrong" the researcher says. Time for round 2, and you are handed a new card to sort. You now put a card that has two green stars on it next to a card that has two yellow squares. "Right" says the researcher. Perhaps you've induced the rule that number is important.

Here's where task switching comes into play: the rule that the researcher uses changes after every 10 trials. The sorting that used to be right will now be wrong, and you have to figure out the new rule. How long does it take you to switch, given the researcher's feedback? Children younger than the age of 9 have trouble with this, and adults with executive functioning disorder will also not do well at the task, at least when the rule changes. While by itself this wouldn't make for a great game, with a bit of effort you could gussy it up into one. In particular I think about the many different variations of the card game Fluxx by Andrew and Kristin Looney, and how the rules change as different cards get played. This would also be a warning not to play Fluxx with anyone with an undeveloped or damaged frontal lobe.

I believe you can think about this issue with bigger, meatier games, both tabletop games and video games. Not because the rules change, at least not usually, but because the rule sets are so big that your understanding of them and appreciation of what you can do within the game changes across time. Your ability to attend to different aspects of the game gets better as you get more into it. My son and I are playing the Rise of Fenris campaign designed by Ryan DeVinaspere for Scythe. Scythe of course already has at least a little heft to it. And Fenris changes the objectives a bit for each of the games within the campaign, so that makes it have that Wisconsin Card Sorting Task vibe. And, I don't want to get spoiler-y here, but the way Fenris is set up for you to read, even though it tells you the objective at the beginning of a game, it doesn't really tell you what the payoff will be until you have completed it. But, bigger picture, because Scythe, and then Rise of Fenris on top of that, has some number of different ways to approach the game, a player might not be able to attend to all of them. That may allow another player to blindside them a bit in terms of the strategy they are pursuing. Looking at and considering the different routes to victory is kind of like task switching. For some of us, me more so than my son I believe, once you start considering one strategy, it can be easy to get your blinders on and not see alternate paths because all your attentional resources are being spent on the path you are pursuing.

This goes for within video games as well. I've touched on this with Horizon Zero Dawn for the PS4 back in Episode 12. In that episode I made mention to cognitive load and strategy use. Both

of these are tied to this current issue of attention. Cognitive load is all about how much of your attentional and memory resources are being used to track your current condition. As you better understand the game, your cognitive load will decrease and you can attend to more issues. That was definitely my experience in Horizon Zero Dawn and other games like it, such as Spider-Man and the Assassin Creed games. You may feel a bit overwhelmed at first, with what all information you have to take in, but as you gain more experience within the game world and its systems, you feel more comfortable, and feel capable of attending to more issues, such as investigating different strategies to complete the missions and other objectives of the game.

Next time you play a game, think about how much of your attention it requires. Different games do require different amounts of attention of course, and that changes as you get more experience with the game. But most games, even ones you have played a lot, require your conscious effort in order to play them, and if you are switching back and forth between playing the game and some other task, your performance at both tasks will diminish.

That brings us to the close of this episode. As always, I welcome any comments or questions you may have, so please email me, steve@cognitivegamer.com and also visit my website, cognitivegamer.com. Also, you can like me on Facebook, Cognitive Gamer, or follow me on Twitter, [@cognitive_gamer](https://twitter.com/cognitive_gamer). And, if you like the podcast, please give a rating in whatever service you use to play podcasts. This will make it easier for other people to discover. Until next time, remember to think about what you play, and have fun doing it.