Post-Stroke Apathy and Depression: Addressing Psychosocial Barriers to Patient Success

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Today's course title is, Post-Stroke Apathy and Depression: Addressing Psychosocial Barriers to Patient Success. And it is my pleasure to welcome Dr. Shannon Compton of physicaltherapy.com. Shannon is a physical therapist with extensive experience in rehabilitation across the continuum of care for individuals with stroke and traumatic brain injury. She received her doctorate of physical therapy degree from the University of Oklahoma Health Science Center. She is, American Board of Physical Therapy specially board certified clinical specialist in neurologic physical therapy and a certified brain injury specialist. She currently practices in the outpatient at the Healthy Aging and Neurology Clinic at the Northwest Rehabilitation Associates in Salem, Oregon. Well, it's so great to have you here with us today, Dr. Compton. And at this time I'm gonna turn the microphone over to you.

Okay, perfect, I hope everybody can hear me. Thank you for that wonderful introduction, and I just want to give a shout out to the University of Oklahoma, go Sooners. See if I can get my slides going here. These are my disclosures, nothing really to disclose. And then we already talked a little bit about me. So I'll just jump right into it and give you guys a little bit of background. I wanted to put together this presentation because I think the emotional effects after a stroke often present a barrier to how our patients progress in therapy. As clinicians, I feel like even if we've never thought explicitly about this topic before, we can definitely hypothesize the myriad reasons that people might have emotional disequilibrium after a stroke; whether it be pathway anatomical changes based on the side of the lesion, changes in neuroendocrine and neurotransmitter function or emotional reaction to loss of their sense of self and their new disability. The list goes on and on. I do think it's intriguing and important to look at two particular manifestations of this emotional disequilibrium after the stroke, apathy and depression. And I chose these two because they affect a large number of stroke survivors and are frequently encountered in our practice no matter what care setting or level of care we provide. So today we're gonna talk about these learning outcomes.
We'll identify at least two aspects of the pathophysiology, clinical course and prevalence of post-stroke apathy and depression. We'll describe at least three clinical features which distinguish post-stroke apathy from post-stroke depression. We'll list at least two outcome measures that can be used in clinical practice to assess the severity of patient's post-stroke apathy or depression. And we can describe at least two clinical strategies to help patients overcome post-stroke apathy and depression to improve clinical outcomes. And just so you guys know, I'm a fairly conversational person. And I think that we learn best by sharing with each other and reflecting on our own clinical practices.

So please feel free to enter any questions as we go along the way into the chat box. Feel free to share about your own experiences with your own patients or things that have worked for you in our clinical practice. That way we can just keep the discussion going. So questions that I wanted to answer today are, why are post-stroke apathy and depression important for us to assess as rehab professionals? What interdisciplinary care team members should we involve for these patients? And are there ways that we can structure our treatments to best support individuals with emotional side effects of stroke?

And I feel like sometimes as rehab professionals, we don't do as good a job as we could with assessing this emotional impact of stroke? We tend to get a little bit focused on the physical side of things. But these emotional side effects can have really important repercussions for how well our patients recover. And I do think that we, as physical therapists play an important role in identifying different people of interdisciplinary care team and advocating for our patients to have good access to other professionals with appropriate resources. And then yes, absolutely, there are ways that we can structure our treatments to promote success for people with anxiety, I'm sorry, apathy and depression. So we'll start today by talking about post-stroke apathy. Someone in the chat box says I have no visual or audio. So, sorry about that. I
don’t know if Kathleen could maybe reach out and help them. And then again, if anybody else has any questions, feel free to enter it into the chat box. All right, so we’ll talk about start by talking about post-stroke apathy. And apathy in general has traditionally been defined as a loss of motivation. However, this is an internal state which is difficult to measure. So recently, apathy has traditionally been defined as this loss of motivation, which, as I said, is an internal state, which is fairly difficult to measure. So recently, research has moved towards redefining apathy as a loss of goal directed behavior, since behavior is something external, which we can both observe and measure.

And in particular, focus on goal directed behavior. And I just wanted to take a moment to recognize how we, as physical therapists frequently describe our patients. So this loss of goal directed behavior, what does that mean, and how do we typically document it? Think about how many times you and your documentation have written that someone has, quote, poor task initiation, or poor task persistence or my favorite, that they exhibit self limiting behavior.

So these phrases describe aspects of apathy. But we’re sort of talking around the issue with these phrases. We’re not saying that this person has post-stroke apathy or apathetic affect. And so something that I would like to propose to you today is that perhaps we should be documenting things specifically as this patient has an apathetic affect or they have apathy so that we can make sure that not only do they have access to the correct resources or the correct interdisciplinary care team after their stroke, but also that we’re using that to document why further skilled intervention is necessary or making sure that they make it to the appropriate level of care after their discharge.

Okay, so post-stroke apathy, occurs in about one third of patients after a stroke. Meaning that again, these clinical features are that they have low motivation, reduced initiation, loss of self-activation, or emotional indifference. There does not seem to be any stronger association between apathy and either ischemic or hemorrhagic stroke.
And as we know as therapists, optimal stroke recovery involves participating in a high volume of repetition of tasks. So these are the patients with this low self-activation, low motivation and reduced initiation. These are the patients who are going to require extra attention in facilities, whether it be inpatient rehab, skilled nursing or long term care to ensure that they’re being prompted by family, by nursing, by rehab throughout the day to engage in meaningful activities and get the number of repetitions that they need to be able to see optimal recovery. So what factors might indicate to you that someone might have apathy as a co-presentation? Apathy is associated with impaired cognition, typically measured by the MOCA. It’s associated with aphasia, lower FIM scores, lower Fugl-Meyer scores and the presence of neglect. But there is no association between apathy and gender, age, chronicity of stroke, or years of education.

And what tends to happen to these individuals with apathy? Well, it does not tend to change very much throughout the more acute phases of stroke, or even over the first year of stroke recovery, it tends to be fairly persistent. And these patients are more likely to be discharged from the acute care hospital to either skilled nursing rather than inpatient or more likely to be discharged to a skilled nursing facility rather than home. And they do tend to require more support From caregivers, whether institutional caregivers or family caregivers, because they do have those lower levels of initiation. These individuals also tend to see lower levels of functional recovery irrespective of neurologic recovery.

So, no matter what their potential might be, they ultimately seem to not realize that potential because their functional recovery just doesn’t match what they’re capable of. So my question for you, for us to think about today is why that might be, and if motivation could be a key component to both neuroplasticity and motor learning. So in order for someone to be diagnosed with apathy, they have to primarily show a loss of goal directed behavior and additionally, symptoms in at least two of these three domains. Their symptoms also have to cause impairment in their personal ability to
interact with others and cannot be explained solely by changes in either their physical functioning, or medications or drugs that they might be taking. There is an interesting aspect of apathy, diagnostic criteria that says also, the symptoms cannot be explained by major changes in the patient’s environment, whether due to natural disasters or acts of terrorism. And we’ll move on now to talk a little bit about post-stroke depression. So the DSM-V defines the diagnostic criteria of a major depressive disorder as including five or more of these symptoms, which are present for at least a two-week period. And interestingly, literature for post-stroke depression does not seem to distinguish between the diagnostic criteria for a major depressive disorder, versus a post-stroke depression in particular.

So these patients will have depressed mood or anhedonia, which is the inability to feel pleasure. They’ll have appetite or weight changes, sleep difficulties, psychomotor agitation, fatigue or loss of energy, a diminished ability to think or concentrate and feelings of worthlessness or excessive, that should say guilt. They also might have suicidal ideation. And some researchers, I did want to note this, that some researchers define apathy as a subtype of depression. And there are overlaps between the two conditions. However, there are really important medical differences in how you medically treat apathy versus depression.

So it is important to try to clinically distinguish between the two when there is not an overlap. So we’ll talk in a few slides about the overlap between the two conditions as well as the differences. Post-stroke depression, just like apathy occurs in about one third of stroke survivors, although some research articles have that number as high as three fourths of stroke survivors, which is mostly related to the time after stroke at which depression is measured. So when they’re measuring depression more acutely after a stroke, the numbers tend to be higher, which indicates that as some people experience physical recovery or better emotional adjustment to their physical functioning, their depression tends to lessen. So overall, about a year after a stroke,
we’re seeing numbers about one third of stroke survivors. Depression does tend to be associated with higher levels of impairment, a previous history of depression, higher levels of social isolation and institutionalization, and a high level of pre-stroke education. There were no strong associations between gender and age and depression. It’s important to keep in mind, I think that post-stroke depression is multifactorial. So it can be related to physical changes in brain metabolism, altered connectivity of neural networks, or it can be related to impaired psychosocial adjustment to changes in physical functioning and life roles. And what tends to happen to these patients? So just like with post-stroke apathy, outcomes for individuals with depression tend to be worse.

These individuals tend to return to the hospital more, have a higher mortality rate, lower functional outcomes and overall decreased quality of life. Interestingly, a study from Korea showed that individuals with family caregivers had lower rates of depression on the Beck Disability Index. I’m sorry, Beck Depression Index, compared to individuals who had institutional caregivers. And that seems to connect to this finding that we’re discussing that higher levels of social isolation and institutionalization can lead to more depression.

So maybe these individuals, since they’re at home with their families, they’re more connected to their families and communities and they’re less isolated. I do want to note, however, that family caregivers tend to have higher rates of depression than stroke survivors, according to research that’s been compiled by the American Heart and Stroke Association. So I think that when we're discharge planning for the patient, we also need to be keeping in mind if they're going to be going home with a family caregiver, that we're giving that family caregiver resources, whether it be as community support group or mental health resources in the community to make sure that they're taking care of themselves as well as their family member. Okay, so we'll talk a little bit about whether or not there’s a physiological basis for post-stroke apathy and
depression. And the short answer is maybe, and the longer answer is it’s complicated. And I find the whole picture very fascinating. So the short answer being maybe, because there's not a correlation between lesion location and development of either apathy, or depression after a stroke. To me, this was very interesting, because when I think about these individuals that I've encountered in my clinical practice, I tend to think of people with left hemiparesis, so a right brain stroke as being in general, more apathetic. And people with right hemiparesis or a left brain stroke, as being more depressed in general.

And then when I brought this up to a colleague, she actually thought the opposite was true. So I guess it just depends on your clinical practice, what you've seen. But whether it was one way or the other way, I thought for sure, in my research, there would be some evidence to suggest oh, people with say a right frontal lobe lesion are going to be more likely to have apathy or a left frontal lobe lesion will be more likely to have depression. Either way, as it turns out, it is not true. So we're going to dive into some of the more crucial elements of the pathophysiology. But I promise, I won't put you to sleep with a long neuroanatomy lecture. Those days are behind all of us, I think. But I think the brain is very intriguing. And the parts of the brain that are affected when in post-stroke apathy and depression are actually very important for motor learning and neuroplasticity. And as physical therapists, we know that our interventions can be structured to optimally support neuroplasticity and motor learning. So perhaps they will play a role in effecting depression and apathy as well. All right, so there’s a very interesting and well-written article that I’ve put in bold in my references section at the end of this presentation. It’s written by LeHeron et al, and it reviews some of the neural networks implicated in apathy across a variety of diagnoses, not just in stroke. And I find that very interesting that the same structural areas are correlated across and implicated across all of these different neurologic conditions. So they went through and they compiled this research that involved MRI, fMRI, MR spectroscopy and PET scans. And they showed that there are regions in the frontal lobe, including the dorsal anterior
cingulate cortex and the ventral striatum are those that are most active in normal motivated behavior, and are also the ones that are not active. So those same areas are not working correctly across a variety of conditions including Parkinson's, Huntington's, Alzheimer's, Frontotemporal dementia, TBI and stroke. There is some evidence in other research that's been done, that there might be a higher occurrence of apathy in patients that have anterior cerebral artery stroke because of the area of the brain that's supplied by that artery.

But apathy is also present in individuals who have a lesion outside the frontal lobe, and not implicated with that arterial blood supply that then disrupts white matter connections to the frontal lobe or changes metabolism in the frontal lobe. So that's why it's not as important where the lesion location is, when you have apathy. It's more about even if the lesion is outside of the frontal lobe, it's impacting those white matter connections and those neural networks. We'll talk a little bit now about pathphysiologic and metabolic changes with post-stroke depression. And again, this is very interesting to me. So there's no clear relationship between lesion location or lesion volume in depression.

However, there are some imaging studies which suggest that lesions which either directly or indirectly by white matter networks, again impact the frontal lobe are correlated with higher rates of depression. And lesions, which directly or indirectly impact the basal ganglia are more associated with post-stroke depression. And that, to me is very interesting when you think about rates of depression and other conditions like Parkinson's disease. So these same brain structures are very highly implicated across a variety of neurologic conditions. There are also gene studies that they've done, which show that some individuals who have a val66met polymorphism, which is a gene which is involved in BDNF production have higher rates of post-stroke depression. So these individuals who have this polymorphism, which negatively impacts their brain's ability to make its own endogenous BDNF, tend to have higher
rates of depression after a stroke. And they also have more issues with cognitive impairment, difficulty with motor learning, and they tend to decline more with aging. And if you’re not familiar with BDNF, I apologize. It stands for brain derived neurotrophic factor, which is a protein that’s involved in promoting neuroplastic changes in the brain, and we’ll talk a little bit more about this as we go on. Metabolic changes in post-stroke depression also include a host of issues that are shown to negatively affect the brain’s capacity for neuroplasticity and motor learning. And we know that even in individuals who don’t have depression or haven’t had a stroke, high serum levels of inflammatory cytokines and low levels of BDNF are negatively associated with neuroplastic capacity.

And we also know that exercise can help alter these metabolic processes to promote, improve BDNF production, improved brain perfusion, and decreased levels of inflammatory cytokines in the brain. So it stands to reason that exercise will have similar effects on the brains of individuals with both stroke and depression. And research evidence supports this. So I ask you now, why should we be measuring this? Why should we be looking and quantifying post-stroke apathy and depression in our patients? And the short answer is that evidence shows that depression and apathy as we’ve discussed have a huge impact on patient outcome, potentially for the negative. So the higher their level of depression and apathy, the more likely they are to have a worse outcome.

And research also shows that early intervention is better. So making sure that patients in the acute care hospital or inpatient rehab or skilled nursing, way before they get to me in the outpatient setting, making sure that those patients have appropriate referrals to either a neuropsychiatrist, a hospital psychologist, a counselor or a social worker, whatever it is, making sure that we’re getting them access to the mental health resources and support networks that they need. And then post-stroke depression in particular, there's evidence to indicate that early use of SSRIs helps improve motor
learning and neuroplasticity, and leads to improved functional outcomes long term. And as I discussed earlier too, I just want to put in another plug for making sure that caregivers, particularly family caregivers have the necessary support that they need. So taking that team approach, making sure that we connect them with community support groups, making sure we’re educating them about different resources available to them in the community and making it normal for them to have these conversations about the mental health aspects of stroke and the impact that it has on their life. So that, whether it's the patient themselves or the caregiver, when they leave us in the acute setting, and they go to an outpatient setting, or even once they're with us in the outpatient setting, they feel more confident having these conversations about their mental health and how that's been impacted, and they feel more comfortable reaching out to, whether it's their primary care doctor, a counselor or someone to make sure that we're addressing that aspect of their recovery as well.

And who should be measuring this? So is it nursing, is it PT, OT, the speech therapist? Is it their case manager? Is it their physician? If you're in a facility based setting, so acute care, hospital, inpatient skilled, you have the benefit of having a team built in who can assess some of these outcome measures. It’s not all on you as a physical therapist to try to make sure that you're quantifying this. But I will say that we as physical therapists can play a role in advocating for these outcome measures to be assessed and discussed at interdisciplinary team conferences. So, as Calista mentioned at the beginning, I've worked in a wide variety of settings across the continuum of care with these patients and these individuals. And when I used to work in inpatient rehab, and I would go to these interdisciplinary team staffings, you're sitting down, nursing, PT, OT speech, the case manager is there, the physician is there. And we're talking about discharge planning for these patients, never did this conversation come up. And whether it was being tracked by nursing, by the physician, whether this was a conversation that was being had somewhere outside of the interdisciplinary team conference, I'm not sure because I can't attest to that. But I would advocate for
the fact that this does become a normal part of the discharge planning process, because it has the potential to so profoundly affect people's outcome in the long term. And I would say an outpatient PT, if you're like me, and you work in outpatient, you know as well as anybody that we have to play the role of case manager. We are our own case managers. There's not necessarily that team president at the clinic. Sometimes we get lucky and we work in a clinic with OT and speech as well, but we definitely have to fulfill more of that case manager role when we work in outpatient.

And so I think, trying to again, as I said, normalize this conversation with our patients and their family members to talk about, well, if you're having apathy, if you're feeling depressed, these things can negatively impact your recovery and I'm here to set you up for success in any way I can. So let's deal with this the same way we deal with anything else. And I think that can be a very powerful tool for patients and families to be able to have that conversation. So, we'll take a look at a couple of different outcome measures for apathy. The first one we'll talk about is the apathy evaluation scale. There's three versions. There's a self-rated, a caregiver-rated, and a clinician-rated. So, as indicated by the names here, the self-rated is going to be the patient is rating themselves.

You can give a version to the caregiver or family member to make sure that their answers are matching up with perhaps the patient's answers. There's also a clinician rated scale. And it's good to note that no matter which version of the scale you're using, all versions are considered to be equally valid and reliable. And in research, they frequently use the clinician-rated scale. The items are scored from one, which is not at all characteristic to four which is quote a lot characteristic, and a score of greater than or equal to 37 indicates apathy, the presence of clinically significant apathy. So a higher score on the scale indicates more apathy. And I'll say a little wink wink nudge nudge, this may come up on the quiz at the end of the course, just to note that, on both the evaluation scale and the apathy inventory, higher scores indicate the greater
presence of apathy. So the second one we’ll discuss is the apathy inventory. And this is a slightly simpler scale. So it looks at three domains which are measured on a scale from zero to four. So it looks at lack of interest, lack of initiation and lack of emotion, for a total score of 12, 12 being severe apathy. And a score greater than or equal to four indicates the clinical presence of apathy. My personal preference among these two is the apathy inventory because it’s a little bit shorter, a little bit faster. It’s a little bit more natural in how the questions are phrased, and some of the questions on the apathy evaluation scale are actually strangely phrased as negatives. So when you go to score it, you have to invert the score and it’s a little bit, just cumbersome, I would say, although it’s used more in research.

As a clinician, I would say go with apathy inventory, because it’s fairly simple and straightforward. And you can easily find instructions online for how to score that. For post-stroke depression, where as clinicians, I think, maybe more familiar with some of these outcome measures, because they’re typically discussed a little more often. So the Beck depression inventory, the geriatric depression scale, the PHQ-2 and PHQ-9, for all of these scales, a higher score indicates more severe depression. And then I’ve listed here for you the cutoff scores.

And that’s just kind of for your reference to indicate what is considered to be a clinically significant amount of depression. And, this is a good way to have a conversation, especially if you’re in more of like an inpatient or an acute setting, and you have close access to the physician. If you’re concerned about the patient, to be able to go to them and say, well, you know, I did the PHQ-9 with this patient and their score is pretty high, and so I’m wondering if, we should be worried about depression and if there’s any medical interventions that can be done to help with their recovery process. I did also want to note that there is something called the aphasic depression rating scale. And this is an outcome measure specifically designed for individuals with aphasia, and I like to point that out because aphasia is correlated more with
depression. Oops, let me go back here. And I just, I put in a quick screenshot here. So if you're not familiar with the edge documents from the Academy of Neurologic Physical Therapy, I think a lot of us are, but the edge documents are a series of recommended outcome measures that are highly evidence based for different neurologic conditions. So there's one for stroke, there's one for MS, Parkinson's, et cetera. And I like to take a look at these just to see, at the highest level of our profession, what outcome measures are being recommended to deal with these patients. And none of the outcome measures that I just discussed actually appear on the stroke edge document.

So take that as you will. I would say that the, I looked through the list of recommended outcome measures and those that are being recommended by the ANPT, there are four and I apologize that the font is kind of small. But the four that are pointed out here, the Euro Quality of Life, the SF36, the stroke adapted SIP-30, and the stroke impact scale, those four include questions about mental health, but they don't focus solely on mental health. They also include questions about physical function, and they also are all a little bit longer.

So if you're looking at, well, I just need a quick screen that I can do in an acute setting or in a inpatient setting or even an outpatient, new patient evaluation where I only have a couple of minutes to talk about this topic, but I want to make sure that it's screened because that's really important, that's when you might go back to the outcome measures that I discussed previously. So how do we distinguish post-stroke apathy and depression? And I mentioned that we would talk about this and that there's a little bit of overlap. So 40% of patients with apathy also present with depression. And that kind of complicates things as far as the medical interventions that we talked about earlier. But there is definitely clinical overlap there. But patients with apathy tends to actually deny feeling sad, whereas sadness is a clinical feature of depression. Those with apathy tend to have disinterest in personal relationships, and that kind of goes
along with their larger disinterest in things. Whereas those with depression do tend to be kind of interested in personal relationships still and still feel that those connections are important. Those with apathy tend to not report fatigue. And those with depression do tend to report fatigue. So this is, if you think about, well, what's the difference between somebody who has depression and somebody who has apathy, I like to think of the patients with post-stroke apathy as being those who, they're kind of flat affect, they maybe not doing much, you kind of ask them, "Hey, are you feeling okay?" And they just are, you know, bobbing their head and they're like, "I'm fine." Whereas those with depression will have a little bit more going on that you might be able to pick up on emotionally.

So what are the medical interventions for post-stroke apathy and depression? So I mentioned earlier, SSRIs, early intervention with SSRIs tends to improve functional outcomes and motor recovery for those with depression. However, and this is where it becomes important, to try to parse out if it's apathy or depression, they've actually found that SSRI use in individuals with apathy either has no effect for motor recovery or can negatively impact somebody's motor recovery. They've done a little bit of research into dopamine supplementation for individuals with post-stroke apathy, using non-SSRI antidepressants, using cholinergic agents, using stimulants.

But based on the research that I've read, it looks like post-stroke apathy tends to actually be fairly resistant to pharmaceutical intervention. But I would still advocate for early intervention, particularly in the case of post-stroke depression and making sure that these individuals are getting the support that they need from their physician and their medical team. So, this brings me to how we as physical therapists can structure our treatments to best support these patients. And so I'm going to go through kind of a framework for how we can approach this. And then I will go through a case study with you guys of one of my patients who actually had some significant post-stroke apathy, and how using this framework helped him really improve his motor recovery. So we're
gonna talk a little bit about the optimal theory of motor learning. And I am not sure if you've heard of this before, I wish there was like a, everybody-raise-your-hands kind of feature. But we don't have sick poll right now. So the optimal theory of motor learning was, this article was published in 2016. And this is one of the articles that is in bold in the reference section. If you have not read it, I highly recommend it because this has definitely changed my clinical practice for the better. So this was published in 2016 by Wulf and Lewthwaite, and they synthesized years of research about motor learning, and they added to it something which I find really interesting, which we brought up earlier, which is that motivation is actually a key component of motor learning.

So the three major components of their framework and we'll go through these individually are enhanced expectancies, learner autonomy and external focus of attention. And some of this is similar to, what you probably learn in physical therapy school about motor learning. But this just really in my mind takes all of those theories a step further and adds that motivational component that is often lacking. Okay, so we'll talk a little bit about first, how the optimal theory affects the brain. And so the authors of this paper pulled together the research and found that these strategies that they advocate for, and this framework that they advocate for has evidence to show that it can actually affect the brain in a physiological manner.

So they found that these individuals who motor learned in this way had increased dopamine production, which we know improves long-term potentiation and enlargement of spiny processes of the neurons. So overall greater neural connectivity in the brain because of improved dopamine production. And these individuals also have greater co-activation of neural networks which goes back to that old adage that we all know and love of neurons that fire together, wire together. So you're able to activate the correct networks to get the motor planning going, and those neurons and those connections become stronger. And how does this work? So, the enhanced expectancies, the first part of this framework deals with the patient’s beliefs about
what will happen. And I wanted to read you this quote from the paper and I should have correctly cited it as Wulf and Lewthwaite. This is attributed to both authors, not as the first author but this quote is that expectations are not motivationally neutral. And I’ll reiterate that for you, because I really love this quote. So expectations are not motivationally neutral, meaning that when your patient, when you ask your patient to do something, and they look at you like you’re crazy, which my patients frequently do with me, and they tell you, “There is no way I can do that,” what motivation then does that person have to try to accomplish a task that is in their minds completely outside the bounds of what they can accomplish?

So their expectations are really feeding into their motivation to learn, to complete the task, whether they’re conscious of this or not. So what are ways that we can set up the person for success? Well, there’s several options to enhance their expectations so that they will succeed at a task. So we can give them positive feedback. So positive feedback after good trials was shown to result in better motor learning. We can give them what’s called social comparative feedback, so telling them that They’re doing better or improving more than average for their condition. We can use self-modeling. And I do this a lot with my patients.

So I’ll video their performance on a task and then I’ll show them videos of the really good tasks, the really good times that they attempted the task. We can do things to modify perceived task difficulty. So by letting people know that individuals with their same condition can succeed at a task, we can tackle their conceptions of ability. So we can portray tasks as something that can be learned, rather than something that you need inherent ability for. And I’m sure we’ve all seen this with our patients where they think there’s no point in working on, say balance because they think you either have balance or you don’t have balance, and that’s the end of the, that’s the end of it. So we can really try to overcome those conceptions of ability. There’s extrinsic rewards. And the authors found in the synthesis of their research that the expectation of a reward is
actually more important than receiving the award. So feeling like yeah, I'm gonna get something out of this is actually more powerful. And then positive affect. And this goes back to our therapeutic use of self that we've all learned about in the past. So anticipation of a positive interaction that's pleasing and rewarding for the patient. And we'll take a look now at what this might sound like when you're talking to your patients. So I am gonna go through and give examples of each one because in my own clinical practice, this has been something that I've had to practice and I've had to work at, to really change the language and the verbiage that I use to make sure that I'm using this framework in the correct manner.

So an example of positive feedback might be something like, that was a really great walk, or you did a great job picking up your left foot. An example of social comparative feedback might be, most people have a really hard time getting the hang of this, but you're picking it up very quickly. Or for self-modeling, telling them look how good your posture is in this video. And something I like to do is even show the person a previous video when we first tried a task and then show them the new one and then compare, and see what kind of improvements that they've made. An example of perhaps modifying perceived task difficulty is to tell them well, with how well you just did with walking, I think you've shown that you have the reactions to do really well on this balance exercise.

And that can be very powerful for somebody who's very fearful about participating in a more challenging task. For conceptions of ability, I already kind of mentioned that, just telling a patient even that balance is something that we can improve and work on if we practice enough, sometimes they just don't know that. And so letting someone know that they have the ability to change and grow and adapt, that can be very powerful for people. Extrinsic rewards, I don't know what you guys have in your clinics or in your settings, but maybe you have a wall of honor, and it's, if they can walk this distance, or if they can hold this balance position for a certain amount of time, they know that
they'll get their name on the wall of honor. And then for positive affect, I'm kind of a goofy person. And I like to joke around with my patients, and I love to tell them really lame jokes. But they all keep coming back for more, so what can I say? So I'll tell them jokes that might include something like what's sour, yellow and fuzzy? A lemon wearing a sweater. There you go, there's your lame joke for the day, everybody. Please share with your patience and let me know how that goes. It doesn't actually, I mean I get a lot of groans when I tell these jokes, they're pretty bad. But it helps people have fun, and that's the important thing.

So the second piece of the optimal theory framework is autonomy, giving patients a measure of control. And I think we can't stress this enough as rehab professionals, especially because these people have had so much control taken away from them in this situation. They're in the hospital, they can't move, they're kind of at the mercy of other people that come in and care for them. They sometimes, if they have dysphasia, they can't even eat what they want to eat, they can't even drink water. So giving them some measure of control over what's going on in their world can be very powerful. So we're going to talk about giving them control over their practice conditions, whether it's giving you information about the type and frequency of feedback, giving them a choice about the assistive device they're going to use, the way that we give them instructions about the task that we want them to participate in, is very powerful.

So we can give them instructions in a way that gets them to participate in the task, but gives them the option of participating in a certain way. And then also, this is something that I'm sure we all know and have heard before, but giving them incidental choices. So choices about things with the intervention that don't really matter. So the order of the exercises that they're gonna do for the day, or the color of whatever equipment is that they're going to use. But that at least gives them some measure of control over their participation. So examples might be, would you like to try the cane or continue with the walker today? And then for instructional language, this was definitely a game
changer for me in my practice, was learning how to say rather than step up there with your left foot, I'll say things now, like, I would suggest leading with your left foot to go up the step. And that might give somebody at least the autonomy and the power to say, okay, she suggests it, and I'm going to take her suggestion. Or the power to try and explore the movement pattern the other way. I'm just giving them a little bit of control over that. And then incidental choices like would you like to walk first or do the leg press first or sit to stands or whatever it is that you're working on that day. And the third piece of the optimal theory is external focus of attention.

So for motor learning, we know that it's better to focus on the outcome of the movement, rather than the quality of the movement. So rather than telling somebody, lift your leg a little bit higher, trying to have them effect some change on their environment or reach a certain target by doing the same amount of movement. So areas for cueing in this area include movement effectiveness, achieving certain results, movement efficiency, so trying to achieve an outcome in the most efficient way possible, or movement form. So achieving an outcome with a certain level of coordination.

And examples of this might be trying to keep a balance board level as someone turns their head, or trying to walk to a target in the fewest number of steps possible. And you can see that that would encourage someone to improve their stride length and their walking speed potentially. Or for movement form, rather than saying like nose over toes, maybe having somebody reaching for a certain target as they try to stand up and that then would bring their body into the correct position to prepare for sit to stand. So, I will pause for just a moment before I get into my case study, and ask if anybody has any questions at this point other than with technical difficulties which I cannot help with because I am not qualified to do that. Okay, seeing no questions, I will proceed. So the case study we're going to talk about today is Mr. H. He is a 53-year-old male who is actually five years post-stroke. And again, I'm an outpatient PT so I see individuals who
are a very long way into their stroke journey. And also being an outpatient PT, if you are also an outpatient like me, you know that we very infrequently, I should say, get good records from the physician, especially when it's this chronic after a stroke. So I don't really know what kind of stroke he had. He wasn't able to tell me. I don't know if it was hemorrhagic, I don't know if it was ischemic, I don't know the lesion location, I don't know. All I know is that this gentleman came to me five years after his stroke. He had had very minimal rehab up to that point per his report. So he said that, after he was discharged from the hospital, and I'm not sure if that meant acute care or inpatient, I wasn't really able to get a clear answer from him, after he left the hospital, he didn't receive therapy at all until he came to see me.

So he has left-sided hemiparesis, and he resides in a long-term care facility that's in his hometown. So his whole family lives in the same town that we live in, but he's unable to live at home with them because of caregiving issues and safety. So he's currently in this long-term care facility. And what did he look like when he came to me? So at his initial evaluation, he came in a wheelchair. He had a left AFO. He had a cane with him, and he was very flat affect. And so when I was trying to do this initial evaluation, I tried to do a really good job of probing into people's goals. So what's your goal? And he told me, "I just want to go back to my life "and everything, I wanna go back to work." And so I asked him, "Well, what do you do for work?"

And he told me, and it was sort of like a variety of odd jobs. And I tried to ask him, "Well, like what's keeping you from going back "to work right now?" And he couldn't really think of anything. And I asked him, "Okay, well, "what do you think needs to happen "before you're ready to go back home or go back to work?" And he couldn't really tell me anything. And you guys know, this is what happens with our patients when we're trying to get them to identify goals. And especially when I worked in inpatient, you walk into somebody's room to do their eval, and you're like I'm Shannon, I'm from PT, yada, yada, let's do your evaluation, what's your goal? And they just want
to walk again. And then you're like, over to the board, and you get out your marker, and you write on their whiteboard to walk again. And that's it, and then the OT comes in later, and they're like, of course they want to walk, like PT gets all the glory, hahaha. But I think pulling that information out of people for what they want to be able, why do they want to be able to walk, what is their motivation, what is their drive? I think our OT colleagues often do a better job than us at identifying and helping people identify their life roles, their goals, what they want to be able to go back to do, what that really looks like for them. So I do try to borrow a page from my OT colleague's books sometimes and really take a look at, for lack of a better way of putting it like what is this person's, quote, meaningful occupation? What is it that drives them to be able to go back to?

So in our early treatment sessions, he had very low motivation, very low initiation, very resistant to try anything. He kept coming to therapy in his slippers, without appropriate shoes, without his AFO which made it very challenging to walk. And we didn't have the appropriate AFO for him to borrow for the session, let alone have the right shoes for him to put it in. And he just kept telling me, I can't do this, you think I can do things I can't do. I can't, I can't, I can't. And no matter how many times I tried to just bring his attention back to his goal, well look, but you want to be able to walk again, you want to be able to go back to your life, you want to go back to work, it just wasn't, the bigger picture wasn't connecting with the current reality. And so we went around and around and around.

And I finally thought to myself, all right, I'm gonna try this optimal theory framework very specifically and explicitly with this gentleman and see what happens. And so this is the point of my presentation, where I'm going to read you a quote by the lovely Brene Brown, which is that, vulnerability sounds like truth and feels like courage, and truth and courage aren't always comfortable, but they are never weakness. And so my vulnerability moment that I'm going to have with you right now, is to really dive into my own imperfections as a clinician. I'm gonna do it with you right now, and I know that,
when I was thinking through this, and I was like, oh, I'm gonna give this talk, it's going to be great. I'm gonna do, tell these people the story about how awesome I am as a clinician, and I really helped this guy and I was looking back through my notes of these months of work that we had done together. Read through all of my daily notes, and I realized like, oh, man, I think I really missed an opportunity early on to appropriately challenge this person and meet him at his current level of challenge and motivate him in a way that allowed him to grow.

So like I said, I wish I could go through this case study with you and say, "Look how wonderful I am as as a practitioner," but I think it's really powerful to also be able to say here's me reflecting on my own practice and how I could have improved, and knowing that I, a person with lots of years of experience with these individuals have not been perfect in how I've approached it, especially with the human or motivational side of therapy. So hopefully going through this with you gives you some idea of how you might implement this with your own patients and in your own clinic and know that it is possible to implement this and you hopefully will see results with your own patients.

So just a brief history of my journey with optimal, so I graduated from, not that this is much of an excuse, but I graduated from PT school before this article was published. And some of my younger, some of my colleagues who are more early in their careers I should say, who went through PT school after this article had been published, were like, oh yeah, you haven’t read this article? Oh, gosh, you guys are teaching me so many new things. But, I knew and this will probably ring very true for many of you. So I know and I knew the mechanics of different aspects of motor learning. So I know about external focus of control, I know about external feedback, and I know about the importance of, the task has to be salient and meaningful to the individual. But I don't think I really had a good synthesis of that information in my mind or a consistent application of those principles to my patients. And I also kind of spent the formative years of my career early on in a treatment environment where the interaction style that I
had with my patients and then all of us at that facility had with our patients was not necessarily focused on fostering patient autonomy to the extent that we really could have. So I kind of went around carrying this internal model with me of like, oh yeah, if I just get people to, like focus on an external locus of control, and I give them certain kinds of feedback, and I just make them do this task a lot, then they'll get better. And as I've discovered, as I've grown as a clinician, that has not necessarily been the case. So we'll kind of look now at Mr. H's scores.

So at his initial evaluation, his apathy inventory score was an eight out of 12. And you'll recall that the higher the score, the higher the level of apathy on this outcome measure, and anything four or greater is considered clinically significant evidence of apathy. And in particular, he had moderate difficulty with a lack of initiative and lack of interest, but major difficulty with emotional blunting. Which those are the three kind of subcategories on the apathy inventory. His first day with me we did a two-minute walk test. He went 43 feet with a small base quad cane and standby assist. And we did a four-square step test, it took him 84 seconds. I had to prevent a fall with min assist. And then at our clinic, we do something called isokinetic strength testing with, it's like a stepper machine, and he with his lower extremities was able to produce 17 watts of power on that first day.

Six months later, his apathy inventory had improved to a four out of 12. And I'll talk a little bit about things that had, specifically things that had improved in a minute. His distance on the two-minute walk test had improved to 120 feet. So he's walking much further much faster. But of note, he's no longer using an assistive device. He's still wearing an AFO, but not using any kind of like cane, and just with supervision kind of from across the room. And he actually was able to complete a six-minute walk test of his six-month progress evaluation. So he went 385 feet total in six minutes, and he almost cut his four-square step test in half, and not needing me to prevent any falls. So stepping reaction is getting much better, and lower extremity strength improving quite
significantly there. So at six months, he had, previously he had had moderate difficulty with lack of initiative and severe difficulty with emotional blunting. When I scored him at six months, he had mild difficulty with initiative and emotional blunting and no difficulty at all with lack of interest. He was so much more engaged with me as a therapist, telling me stories about his family and telling me stories about the staff at his care home. He was asking me about my life which he had never done before or shown any interest in. So seeing an improvement and an engagement in those personal relationships, which is something we discussed earlier. And even just interacting with the receptionist at our clinic, just so much more outgoing, friendly. He would get to the clinic, and we'll talk a little bit about this too. He would get to the clinic, towards like the six-month mark and he would come in, and I almost had to tell him like, you can't come back into the gym until I'm ready for you 'cause he would like wheel himself all the way back into the gym and be like, "I'm here, I'm ready, we're gonna go, "here's what I want to work on today."

And that was just night and day difference from when I first met this person. And he was just telling me I can't, I can't, I don't want to, I don't know how, just resistant to everything. So, in total so far, he has been in PT for a total of seven months, which we're going to resume his care. Our state just recently started reopening, so we're actually gonna be able to resume his care in a couple of weeks, which I'm really excited about.

He's kind of been on hiatus, as we all have been since March. At four months, I implemented the optimal theory very explicitly. And as I mentioned, so far, he's demonstrating much greater sense of self-agency, much better goal-setting, much better motivation and just interacting so much more with the people around him. And well, kind of more specifically, so this is data from a variety of progress tests that I did. And this is looking at walking speed in meters per second. So because his goal was to work on walking and getting back to community ambulation, I looked at walking speed
as an indicator of his ability to safely navigate community spaces. And so you can see that even before I implemented the optimal theory, he had improvements in gait speed, just by virtue of participating in regular therapy and being engaged more and more active. And if you recall, he hadn’t had therapy for almost five years prior to this. So, after feeling like we’d hit a wall or feeling like I had hit a wall with his motivation and kind of like lack of participation, I decided to really explicitly institute the optimal theory at that four month mark.

And initially he had a dip in gait speed of five months. But that’s also when he started walking significantly further. And at first, his perception, again we’re going back to, patient’s perception of their ability to perform tasks. So at first, his perception was that he could only walk longer distances if he went very slowly. But by setting goals with a focus on an external focus of attention, so for example, like I mentioned earlier, walking a certain distance in the fewest number of steps possible, his gait speed increased significantly, and he was able to feel like it was possible to walk faster for longer. We did a lot of practicing and a lot of repetition of walking certain distances and either timing him or counting his steps so that he had very explicit results about, of how he was doing with his walking. And every session, I would ask him to identify his own goal for how fast he wanted to complete a certain walking set or how much, how many steps he would complete a distance in so that we were increasing his autonomy with goal setting as well.

And then I would give him feedback about his goals. So I would give him feedback. Positive feedback after the good trials, I’d give him social comparative feedback and say, "Oh, you're doing so much better than people with this," or "I'm so impressed by how well you're doing "compared to others." And then we also have a treadmill. We did self-modeling with a treadmill that we have that has gait pattern analysis and gives feedback to the patient about their gait patterns, stride length and speed. So that was one of the forms of self-modeling that we used. I did not really do video self-modeling
with this person because he found it very distracting to know that he was being filmed. So we just decided not to do video and went with our fancy treadmill instead. I see a couple of questions here. So I'm gonna pause. Arlene says, why was it implemented at four months and not earlier? Just wondering, and a follow up, just wondering if certain conditions needed to be met prior to being able to implement the optimal theory? Those are really excellent questions. There's no specific sort of like precursor that the person has to demonstrate prior to using optimal. I've seen optimal theory implemented, even with people with cognitive impairments or dementia. This is again, going back to me being vulnerable is just, I probably should have implemented it earlier, but I didn't and then I got to a certain point in his care where he was starting to reach a plateau and rather than asking myself, you know, why is this, rather than saying like, okay, I guess this guy has just achieved his maximum level of potential and he's plateaued, I said what else can I do?

What am I not doing? I feel like I'm not reaching this person on like a psychological motivational level. And there's some other factors going on emotionally that are limiting his participation and is there some way that motivationally I can get to this guy to get him to continue to improve? And that's when I decided to just be very explicit about saying like, okay, I'm going to work on enhanced expectancies, I'm going to work on improving autonomy and I'm going to work on, these things to try to make sure that he has the best outcome that he can. So that was a very good question, Arlene. Nothing specific, that is like a precursor. Oh, and a follow up question. So if I can use it earlier, I can, right, yes. Please use this as soon as you feel like it. And it definitely ties into motivational interviewing, which is something that I did not get a lot of in physical therapy school. If it was mentioned in my program I have to admit, maybe I was asleep in class that day. But for me, the first time I even heard about motivational interviewing was from one of my friends who when I was in PT school, she was in masters of social work program. And she did a motivational interviewing project on me. And so that's when I first learned about motivational interviewing. And, you would have thought that I
would have thought, "oh, hey, this really applies to my professional practice as a PT, but it's taken me, several years to get to the point where I see the value of really doing all that we can to help get patients really invested in their own care and their own outcome, whether it be through motivational interviewing, whether it be through the optimal theory, just trying to make sure that we get that motivation component of neuroplasticity and motor learning engaged. All right. Another question. Oh, thank you. Okay, just a comment. We will look at the next slide. So this is where, so this is a chart showing the furthest distance that this individual walks in feet. So when we first started, he was down at 43 feet and then he was all the way up to at six months walking 385 feet, which is a huge change.

And for me, this is where it's really evident that the optimal theory was working for this individual, because you can see from initial eval to two months, there's a bump up. He's still under walking 100 feet. From two to four months, you can see that it's like, the bump up is starting to get quite a bit smaller, maybe leveling off a little bit in how far he's able to walk before he is getting fatigued and needing to rest. And then, and again, that goes back to that self-perception of what can I do? Is this possible? And he was just continuing to think like, well, she just wants me to walk, like this is as far as I can go.

When I implemented the optimal theory, you can see from four to five months, there was a significant bump up in the distance that he was able to walk and then from five to six months, again, a significant bump up in the amount of distance that he was able to walk. So going back to that, quote, that, oh, my goodness, I'm forgetting it now, but expectancies are not motivationally neutral. So once he had the expectation that he was able to complete a task, he was able to be more motivated to complete it and engage in it. And so how did we get him to go from thinking this is the most I'm gonna be able to do, to being able to think it was possible? We started by setting very small goals. So we started with 10 feet, 20 feet, 30 feet, and letting him have the experience
of success with those smaller goals. And then giving him explicit feedback about his success and just building from there. And I wanted to take some time for you guys, oops, to model exactly what this looks like, as far as his evolution of goal setting. So, when he first came to me during his initial evaluation, he said I want to go back to my life, everything. Very broad, nonspecific goal. We hear this from so many of our patients. So about week 13, he said to me, "I want to be able to walk across the room without anyone's help "but I think it will take me three months to do that." And what he meant by without anyone's help, was he meant he wanted to be able to stand up from a mat table, set at like a 20-inch height. So very sturdy surface, relatively easy height to get up from.

And he said he wanted to get from that by himself, he wanted to grab his cane and walk across our gym, which is maybe 30 feet. And I knew the day he told me, the moment he told me that, I was like, "Well, you could do that right now." But I didn't say that to him. I just said "Okay, how long do you think it would take you "to achieve that goal?" And he said three months. So I said, "Okay, let's see if we can get you there. "What do you think about one month?" And we kind of had this like negotiation, because in the back of my head, I'm like, "Well, you could do it right now." But in his mind, that's not possible.

So we kind of, you know, negotiated a little bit. And we'll all go through another timeline in a moment and show you kind of where he met that goal. But then, week 16, his goal was, I want to be able to walk without my cane. And this is where I'll get on my soapbox a little bit. Not that I haven't been already, but I'm sure we all have patients after a stroke who are like I want to be able to, quote, walk normally again, and that to them means, or I want to be able to walk again and that to them means without using an assistive device. Some people are going to be appropriate for that and some people are not. This gentleman is appropriate for that. And so, I said, "Okay, you want to be able to walk "without your cane, let's work on that." If he had been someone where, I
was far more worried about his fall risk, then I would try to walk him back from that a little bit. But this was his goal, and I thought that was appropriate. So we're going to work on it. The next week, his goal was I think I can walk so we're starting to get more specific here. He says, "I think I can walk 10 steps "without holding on to anything."

And this was, all the therapists who work at my clinic know this gentleman and know that it's kind of funny that he would say, he was so adamant. "I'm gonna walk without a cane," and then he would like cruise all the furniture and the equipment in the clinic. Like he'd walk two steps, grab a bike, walk two more steps, grab a treadmill, walk two more, you know.

And I'm sure we all have patients like that. So I made him really buckle down and I said, I want you to tell me how many steps you think you can go without touching anything. So we started at 10. The next week, he was up to 20. He said, "I think I can go 20 today." And then a couple of weeks later, he was like, "I think I can walk the whole gym," so 30 feet without touching anything. And from there, it just really took off. He would wheel himself back into the gym and I would say, "Okay," get him warming up on the bike, and I'd say, "okay, what's our goal today? "What's our plan? "What's our strategy?"

And he would say, "Today, I'm going to work "on walking on the treadmill, I'm gonna do the leg press. "And when I'm on the treadmill, I'm going to go "for four minutes without taking a rest break." Perfect, these are great goals, let's make sure we get all of that done today. And then as you started to see success and as he started to to get that, good feedback and that dopamine flowing of like, "Oh yeah, I'm accomplishing my goals," his goal started to get a little bit bigger and back towards the goal that he came in with originally, which was to, quote, get back to his life. So he's week 22, he comes in and he's like, "I think I want to try to move back in with my family." But, and this was something he was not able to do initially, when we started working together, he said, "Before I can do that, before I can move back in "with my family, I need to be able to
work on my endurance “because I have to be totally independent.” And this is why he’s in a care facility, is because his family is not able to provide any caregiving during the day. They’re really only there overnight, essentially, ’cause they all work and there’s nobody, there’s no financial resources, et cetera, et cetera to be able to have in home caregiving. So this is his thing is I have to be able to be fully independent during the day. And if I’m gonna do that I have to, in his mind, have better endurance to be able to get up when I need to, walk when I need to, take care of things around the house. So, I’m gonna go through a few of these goals and kind of show how we broke things down into bite-sized pieces for him, and just focusing on how we used autonomy and an external focus of attention to help really channel his goal setting.

So when he told me, "I want to be able to walk across the room "without anyone's help, but it's gonna take me three months "to be able to do that," I said, "Okay, well, walking across the room is gonna take you "three months, but do you think you can stand "and walk from here to," we have this center post in our clinic, "So can you walk from here to the center post without help?" And he said, "I'll try." And that was a distance of about 10 to 15 feet. So, for enhanced expectancies, I was able to tell him, "Based on how well you've been walking today, "I'm sure that you can walk from this table "to the center posts without my help."

He was pretty unsure. But he was able to get up and do it, which I knew he could do, but he did not know he could do. And that's the key. After his success, I made sure to tell him, "I'm so impressed by how you accomplish the goal "you set for yourself, "how do you feel about achieving that goal?" And this is something that's not necessarily mentioned in the optimal theory, but I find that it's very important for my patients and for this patient in particular, to do some self-reflection after they've accomplished a goal and to very explicitly state to them, you accomplished a goal you set for yourself. You said I will try to stand from here and walk to the center post without any help, and he did. And so just building that sense of self-reflection, and that sense of
accomplishment was really powerful for him. So from there, he told me, "I want to be able to walk without my cane." And I tried to foster his autonomy of goal setting. So I tried to model for him how many steps do you think you can take without holding on to anything? So in his mind, he's like, I just want to be able to walk without my cane. Well, that's a really big, that's a pretty broad thing. That could mean walking a mile, that could mean walking 10 steps. So I tried to model for him how to narrow that down. So he said, "Well, I think I can take 10 steps "without holding on to anything." And at first, he was very challenged to even go 10 steps without holding on." And again, just emphasizing it's not due to safety so I was very confident that this was a person who could walk without a cane.

But he was so fearful because he's been for so long in a wheelchair and using a cane, even though he maybe didn't necessarily need to, because he hadn't had rehab. So we just provided really positive feedback after successful trials. And even if it was that he wasn't able to go the full 10 steps, it was like, "Well, you went six steps that time, that's really great. "You're almost to your goal. "Let's give it, take a rest and let's give it another try, "because I think you're gonna get there." And once he achieved that goal of making it 10 steps several times, I asked him if he was ready for a larger goal. So again, fostering that sense of autonomy and having him really engage and self-reflect, am I ready for a larger goal?

And we just continued to build from there. And that's how this gentleman was able to progress from where he was initially, all the way up to walking 385 feet without an assistive device, and with distance supervision. So did optimal theory, quote, fix this patient's apathy? So I'm not claiming that. I don't think I can claim that in any sense of the word even though he had a large improvement from an eight out of 12 on the apathy inventory to a four out of 12. But I am claiming that using the optimal theory and modeling goal setting for him each session set him on a trajectory towards greater autonomy and independence. So just that reinforcement every session of okay, I'm
going to set this goal for myself, I’m going to reflect on that goal, did I achieve my goal? Was the goal too easy? Was the goal too hard? How can I modify the goal going forwards? We worked on that so much. And I do think that there’s evidence to support that he’s had an increase in goal directed behavior. So if apathy is a decrease in goal directed behavior, he’s had an increase in that. And so I believe that that very much accounts for his improvement on the apathy inventory. I did call him recently, during this whole COVID shut down, and I asked him how he was doing at his care facility. And he said to me, that he is doing a home program every day. I will say that this is not a home program that I had given him. So it’s 100% self-initiated home program. And he is bopping around in the care facility. I spoke to one of the nurses there. And it sounds like he’s driving them a little bit nutty because he’s so, he's got so much drive now that he's just constantly asking them, like can I do this, can I do this, can I do this, can I do this?

So kind of gone to the other end of the spectrum in terms of initiation. And I just wanted to touch on two other things that might have played a role in his improvement. So we can’t give the optimal theory alone all of the credit for this. Definitely there are other principles of neuroplasticity at work. So we were doing a significant amount of cardiovascular conditioning, whether it was on the treadmill, walking over ground, getting his heart rate up. And that tends to, research shows that that tends to increase the brain’s production of BDNF and lower inflammatory cytokines and improve cerebral perfusion.

So that could definitely have played a role. We definitely focused on task-specific strengthening. So when he started, like many individuals will left hemiparesis, he does everything on his right side all the time. Anytime he tries, would try to stand up, it was almost as though his left leg didn’t exist. So he was just doing a lot of single leg sit and stands on his right side. Really just hesitant to put weight on that side, impacting his stride length and all kinds of things. So just a lot of tasks specific strengthening to try
to promote, improve weight bearing on the left, which is the affected extremity, trying to get him to trust that leg a little bit more so that as he's stepping and negotiating things like obstacles, steps per, community spaces, he's able to have a look more stability on that left leg when it's in stance phase. And a lot of dynamic balance training, because this gentleman wants to not use a cane in the long run. So he definitely, we spent quite a bit of time working on anticipatory postural reactions, compensatory stepping reactions, just trying to make sure that if he has some kind of perturbation that he's able to catch himself appropriately. And that's definitely, still a work in process. So not ready to be fully independent without an assistive device at this time. But hopefully, when he gets back to the clinic, we'll continue with that. I have a question here. How do you handle the situation where a goal that was selected by the patient was too difficult to achieve in a timeframe? Oh, I'm having trouble reading the whole question. It looks like too difficult to achieve in this specific timeframe, i.e. within session, I fear this could cause increased apathy. That is a really good question. So something that I really focused on with him, was trying to help him model how his goals could be broken down into smaller pieces.

So for example, when he said, you know, his goal was like to walk again, to walk normally. That's a very broad goal, and that's something that a lot of our patients tell us and that's obviously not gonna be accomplished in one session. So we tried to kind of, you kind of try to help them drill down to and guide them towards a goal that can be accomplished within session. And I definitely see how if someone is like, I really want to do this and they're not able to get it done within one session, and it's something that is a really broad goal, that would be very discouraging for them. And again, very demotivating for them to try to continue to participate. So just making sure that whatever it is that they're doing, saying, well, if your goal is to walk quote, normally again, what if we start with trying to walk from here to there with less assistance. Or if your goal is to, I'll ask people, "What does normally mean to you?" And they'll tell me, "Oh, without a cane," or "Without you holding on to me", or whatever it is. And so I'll
say, "Okay, that’s a great goal, "I really like your goal, let’s talk about ways "that we can make that very realistic for today." So hopefully that helps answer your question. Any other questions before I go on? Okay. So what am I leaving out of this case study? So pulling in an interdisciplinary care team, that’s definitely something that I haven’t done as much. I’ve gotten the nurses at his care facility involved, just to reach out to them and make sure that they’re aware of like what is appropriate for this patient to be doing. For example, he should not necessarily be walking around his care facility independently with no assistive device without any supervision, for safety reasons. 'Cause like I said, we’re not there yet with his dynamic balance. And also talking to them and making sure that they are aware of his goals and aware of the apathy that he might have and trying to make sure that they’re keeping him engaged.

Although at this point, it sounds like that is not an issue for them in any way. He’s very engaged, but if he continued to present with apathy, it might also be something where we might pull in his primary care physician and talk a little bit about, even though apathy is fairly resistant to pharmaceutical intervention, talk about, well, should we try something? Or should we try to get him connected with a support group? Or how can we make sure that the caregivers that are present are engaged enough with him to keep him motivated and keep him active?

And so the lessons that I learned in this journey of creating this presentation and working with this patient are that post-stroke apathy and depression are very widely prevalent and have very profound effects on our patients’ recoveries. The post-stroke apathy and depression don’t have specific associations with lesion location which very much surprised me, but are associated with altered neural connectivity, altered brain metabolism and psychosocial adjustment to changes in physical functioning and life roles which just another plug for our OT colleagues, I think they do an excellent, excellent job of looking at a person’s overall life roles. And that’s something that I really have learned a lot from my OT colleagues on. Also, early intervention for these
conditions is best and can include pharmaceutical or non-pharmaceutical strategies such as the optimal theory. So back to the previous commenter's question, how soon can you implement this? And the answer is day one, if you're able to, and using the optimal theory work to foster patient autonomy and achieve successful outcomes. Any other questions? No questions, I'm not seeing any. I can talk a little bit about, we have a little bit of time left and I wish I had, I don't know if there is a way that I could pull up a video. Oh, I do have a question. I can perhaps message Calista or Kathleen and see, but I do have a video of this.

Oh, not possible to view video, never mind. I can talk about this video. So I can continue to talk a little bit about this patient and things that did not work with me. If you have any questions about strategies that were not as successful, I'm definitely happy to share my learning with you guys. Someone has asked me about the answer for different questions on the exam. And I don't know if I'm allowed to give you those answers. Oh, Calista says we can. Okay, let me pull it up really quick here in my email. Okay, let’s see if I can make these screens overlap so I can read at the same time. Oops, technology issues, okay.

So, my exam questions, post-stroke. The first one is post-stroke apathy is primarily defined as a deficit in? And the options are emotional connection to others, goal-directed behavior, cognitive status or problem solving skills. And as we discussed previously, goal-directed behavior is how post-stroke apathy is primarily defined at this point. Question number two, a clinical feature that distinguishes, and also, would you guys like me to go over why certain answers are not the answer? Let me know in the chat box if that would be helpful. Question two, a clinical feature that distinguishes post-stroke apathy from post-stroke depression is that patients who are primarily apathetic will report feeling or will report feeling sadness. So post-stroke apathy, will the patients feel sad? Will they feel, will apathetic patients feel more interested in their relationships? Will they feel a lack of interest but no associated sadness? Or will they
feel sleep deprived? And someone has commented why, that it would be helpful for me to explain why the wrong answers are wrong or incorrect, is probably a nicer way to put it. So on question number two, we discussed that feeling sadness, so answer A is clinically correlated with depression rather than apathy. On answer B, feeling more interested in their relationships, individuals who are apathetic tend to feel less interested in personal relationships, but continuing to be interested in relationships is more of a feature of post-stroke depression. And we said that lack of interest, but no associated sadness is a clinical feature of post-stroke apathy. And answer D, sleep deprivation, kind of going along the lines of fatigue. So individuals with depression tend to report more fatigue and individuals with apathy tend to not.

Question three, the prevalence of post-stroke depression and apathy is, answer A, about 33% or one third for both conditions. Answer B, less for depression than apathy. Answer C, higher for females or answer D, lower for patients with lower education levels. So answer A is correct. We said about one third of patients with, after a stroke experience apathy, and about one third experience depression. Answer B is incorrect because depression apathy occur at similar rates.

Answer C is incorrect because there's no correlation, or no association between gender and either depression or apathy prevalence. And then answer D is incorrect because both depression and apathy tend to occur more in patients who have higher education levels pre-stroke, okay? Question four, I'm just checking. There's no other comments right now. Question four, to quantify patient apathy post-stroke, clinicians can utilize either a visual analog scale, the apathy evaluation scale clinician version, a verbal description of current feelings or the Barthel index. And this question is just trying to get you to recall the two clinical outcome measures that we can use to measure apathy. So one was apathy inventory. And then the other one is apathy evaluations scale, the clinician version, and you'll recall, there's three versions of the app of the evaluation scale, and they're all equally valid and reliable. Question five, a
blank score on the apathy evaluation scale indicates blank apathy. So if you recall, I kind of said wink wink nudge nudge on one of those slides. And when we’re talking about the apathy evaluation scale, a score, of course greater than or equal to 37 indicates clinically significant apathy. So, the higher the score, the more likely you are to have clinically significant apathy. So a higher score is related to higher or indicates higher apathy. I have a question, what were the emotional interviewing questions you, how do I make this larger? Kathleen? Oh, thank you. What were the emotional interviewing questions you asked your patients?

If you could clarify for me, Ingrid, if you mean, a motivational interviewing question or specifically an emotional question that I was asking them, because I talked about doing motivational interviewing but not necessarily interviewing them about specific emotions outside of talking about the apathy inventory. I’ll let Ingrid, maybe comment back on that. And then I have another question from Stephanie. I work in acute care, we tend to have difficulty with patients with aphasia. Yes, when psych is consulted, they often say, patient aphasic will sign off. Do you have any suggestions on the next step to motivate these patients who have apathy and/or depression, but have difficulty verbalizing? Yeah, so this is a whole very interesting beast.

And I would say if you have the ability to really tag team well with speech therapy, they are gonna be really huge, like game players in getting, figuring out a way to help these patients communicate whatever it is that they’re trying to feel. I know it’s really challenging with people that don’t, medical providers who don’t necessarily work in rehab. So whether it’s psych or like neuropsychologists or something like that where you would think that they would have that experience with aphasic patients, but it can definitely be very challenging and they kind of just say, well, the patient has aphasia. So, I would say trying to find, like I said, I guess it depends if they have receptive aphasia or expressive aphasia, if they have receptive, it’s gonna be definitely very challenging, to work on specific aspects of like motivational interviewing. But if there’s
ways that they could do a communication board, or even communicate like thumbs up thumbs down, to just ask them those yes, no questions of like, do you think you could stand for this long today? Thumbs up, thumbs down. Or do you think we could do this today? Thumbs up, thumbs down. Is this goal reasonable for you? Thumbs up, thumbs down. It's tough without thinking of like patient specific situations, because every patient with aphasia kind of communicates a little bit differently and has their own style. But I think that's a great question. And just trying to maybe modify your questions that you ask the patient to be yes, no style and see if you can figure out a rhythm with them there.

And even checking in with them and saying like, is this, sometimes I'll even ask my patients who don't have as many communication difficulties, I'll say like, I think this. So, using enhanced expectancies, I think you can do this, is that reasonable? And then I'll have them, agree or disagree and we can kind of build from there. But it's definitely a process of building the relationship with that patient and building on their success and building their strategy slowly, little by little. Very good question. Ingrid followed up, you said you utilize the interviewing.

Maybe you lost me there. Oh, yes, so it was motivational interviewing questions. And this could be a whole other. If you've had an opportunity to take a course on motivational interviewing, I'm sure physicaltherapy.com has some kind of motivational interviewing course, they're definitely out there. But there's many options for ways to approach it. So I try to ask people questions about, what do you think you need to do to do X? So if their goal is to be able to get up and walk across the room, "I'll say what needs to happen for you to get there?" And then you try to have them self-identify. "Well, I need to be able to stand up on my own." "Okay, great, what needs to happen for you "to be able to stand up on your," and you kind of break it down into smaller pieces and see if you can get them to have the autonomy to self-identify, these are the things that need to happen for me to get from point A to point B. And your role as a
therapist is to rather than give them the answers, which this kind of goes back to my early work setting, it was very much focused on we were giving people the answers and saying like, you should do this. I’ve really switched to more, asking the patient what needs to happen for that to happen and trying to go them with very pointed questions. Even as specific as well, “You're telling me that you want to be able to get up "and go to the bathroom by yourself "in the middle of the night? "Do you have any safety concerns about that?” And if they say no, because some of our patients after a stroke, have poor insight into their deficits, that's where you might say, "Okay, well if you were to have safety concerns, "what would they be? "Where would the safety downfalls be?” And then you have them identify those things, and then you work on a game plan together.

So it's really like, very much a conversation going back and forth. Or if they come to you and they have that really like a, kind of a lack of motivation, you say, and the only thing you can get out of them is I want to be able to walk again, that’s where you start to break it down into those bite sized pieces, and say, "Okay, what is it that you want to walk again for?" And if they're really not giving you anything, you could prompt them based on what you know about their life and say, "Well, would you like to be able to cook for yourself? "Would you like to be able to go "to your child’s soccer game?” Whatever it is and kind of use that approach. How did you get the insurance to pay for so many months of outpatient PT?

That is a great question also. Yes, so different insurers are definitely more challenging to work with. And those people, or those insurance companies, I should say that limit visits are very challenging. And so those people that have very limited visits, I really try to connect them. We have a community-based private pay stroke exercise class that we have at our clinic. And so if people have limited visits, we try to be really strategic about how we use them and try to supplement their one on one physical therapy time with those private pay exercise classes. In this person’s instance, they have an
insurance where as long as we're able to justify further skilled care, we're able to continue providing it and continue being paid for it. So just making sure that we're continuing to justify his progress evaluations, that he's making progress, that he continues to require the skilled level of care that we're providing and going forward. So hopefully that is somewhat helpful. I know it's really different from state to state and insurer to insurer. Okay, seeing no further questions right there, I will go back to reviewing the test answers. So we left off, we finished question five and the answer was B. Higher score on the app, the evaluation skill is the key to a higher level of apathy.

Question six is areas of the brain most often implicated in both apathy and depression include answer A, the occipital lobe, including the dorsal and ventral stream. B, the temporal lobe, including the fusiform gyrus and superior temporal gyrus. C, the frontal lobe including the anterior cingulate cortex and B ganglia, and D, the parietal lobe including lateral and ventral intraparietal areas. So, answer C is correct in this case, and even if you don't remember the very specific parts of the lobe of the brain, if you just got frontal lobe, you're in the right track. So the frontal frontal lobe is very very important for both motivation and highly implicated in apathy and depression. Question seven, the optimal theory promotes motor learning by increasing learner autonomy through which of these below?

Answer A, encouraging words. B, focusing on incorrect movement patterns. C, enhance expectancies and an external focus of attention. Or D, constant feedback from a therapist. So A, while nice, encouraging words don't necessarily have any specific outcomes associated with them. B, focusing on incorrect movement patterns is not correct because you want to give the person positive feedback after good trials to most support motor learning. Answer C, enhanced expectancies and an external focus of attention is correct. So those were two of the three pieces of the optimal theory framework. And answer D, constant feedback from a therapist, constant
feedback has not really been shown to result in effective retention of motor learning tasks. Question eight, an example of having a patient set goals consistent with the optimal theory for their session includes having the patient state quote, I want to walk. Answer B, asking the patient, what do you think is a good target to walk towards this time? Answer C, telling the patient you need to decide what you want life to look like after you return home. Or D, having a dependent patient set a goal to emulate without assistance. And this question kind of parses out a few of the things that we’ve talked about recently. So having a patient state, I want to walk is not the answer, ‘cause that’s one of those really broad goals.

Even though it’s demonstrating autonomy, it’s not a very specific goal, it’s not something that they can really accomplish in the session. Answer B is correct, because you're asking the patient, what do you think is a good target to walk towards this time? So you are asking them for autonomy, you're helping them set their own perceived level of competency with a task. They're able to decide, I think I can do this. And so that’s really fitting in with optimal theory. Answer C is telling the patient, which nothing in optimal theory really involves telling the patient anything, because it really doesn't support patient autonomy, but you need to decide what you want life to look like after you return home.

Pretty nonspecific there, very demotivating potentially. And answer D, is having a dependent patient set a goal to emulate without assistance. That’s a really big goal for a patient who is currently dependent, and so that’s something where You would want to really take some time with that patient and talk to them about, okay, well what does today look like? What is tomorrow look like? Let's break this goal, this huge goal that you have into bite-sized pieces because you can’t eat an elephant in one bite, we gotta eat it one bite at a time. Question nine, patients with a higher level of depression have a higher rate of? Answer A, acute care hospital setting. I'm sorry, acute care hospital discharge. B, poor functional outcomes. C, social integration into the community. Or D,
success with goal setting. And we discussed earlier that those patients with a higher level of post-stroke depression tend to have higher levels of acute care readmission. They tend to have poor functional outcomes, which is the correct answer, which is B. They tend to be more socially isolated, and they tend to struggle to meet their functional goals. Question 10, which of these is an example of helping a patient develop more autonomy through making small choices each session? So allowing them to decline therapy based on lack of interest, which I know we have all been there, walk into the patient's room and they say, "Nope, not doing it today, please leave." And that's if they're being kind. Answer B is having the patient choose which therapists they work with. Answer C, letting the patient select between two appropriate assistive devices prior to a standing or ambulating task. Or D, asking the patient to name preferred foods as they walk. So C is the correct answer. So you have a choice of two appropriate assistive devices, it's not going to dramatically change the task or the outcome.

So it's an incidental choice. And you're going to let that person have control and autonomy over which devices are going to select there. I'm just going to pop back over here. And I have no more questions that I've seen at this time. Here are my references, and as you can see, oh, they were bold and they're no longer bold. So, on this slide, the one, two, three, the fifth bullet point down, LeHeron et al, "The Anatomy of Apathy: A Neurocognitive Framework for A motivated Behavior" is very good, highly recommend. And then on this page, you can see the last reference there, Wulf and Lewthwaite, "Optimizing Performance Through Intrinsic Motivation and Attention for Learning" which is what optimal stands for. That is the article about optimal theory of motor learning. And reading that article just made me so excited to try implementing it, and has really changed how I practice and how I interact with all of my patients. So I highly, highly encourage you to go read this no matter what setting you're in or what level of care you provide, because I think it's got a really powerful potential to engage our patients early on, especially early in their stroke recovery and make sure that they
get a good handle on that motivation and that drive and that sense of autonomy and regaining that sense of control that they’ve lost since this really traumatic event has happened to them. Okay, any further questions, and if not, I will turn it back over to Calista.

- [Calista] All right, well, I don’t see any questions either, Shannon, but before we close out, I want to thank you for presenting for us today. And I do want to remind everyone that’s in our classroom that Dr. Compton is coming back and presenting another course, coming up here in a few weeks, and it’s titled Innovative Treatments for Patients Post-Stroke Across the Continuum of Care: Evidence-Based Strategies to Improve Outcomes. So check that out on our website and register for that. And if you're viewing this on the recording, it should be available on the site in mid-June 2020.

- [Shannon] I’m very, yeah, I just want to plug a little bit for that Calista, there's gonna be a ton of patient videos in that and it's mostly case presentation based. So I'm really, really excited to kind of just strategize with people about things I've done with my patients that have been successful and try to help people take those ideas home to their own patients at their own clinics.

- [Calista] Wonderful. Well, hope to see several of you in that classroom on June 10. Have a great day, everyone and thank you again, Dr. Compton.

- [Shannon] Thank you.