Dr. Melissa Brotman, Ph.D.

Behind The Mask

January 19, 2022

Barr: Good afternoon. Today is January 19, 2022. My name is Gabrielle Barr, and I'm the archivist at the Office of NIH History and Stetten Museum. Today I have the pleasure of speaking with Dr. Melissa Brotman. Dr. Brotman is the head of the Neuroscience and Novel Therapeutics Unit (NNT) in the Emotion and Development Branch at the National Institute of Mental Health (NIMH). Today, she is going to be speaking about some of her unit's COVID-19 related research and some of her own personal experiences. Thank you very much for being with me.

Brotman: Thank you so much for having me.

Barr: Absolutely. To begin, do you mind introducing the focus of your unit's research? Will you explain the health issues that anger and irritability may cause children and their families in the short term and in the long term?

Brotman: It's actually quite interesting. We know that psychiatric disorders are highly prevalent, and they often present in childhood. In fact, one of the most common reasons kids are brought in for care is because they're demonstrating clinical manifestations of anger and irritability—and that generally makes sense. If you're thinking about kids who are causing problems for their parents and with their friends and in school, it's often because they're demonstrating some level of emotion dysregulation. When we look at epidemiological studies, it's actually one of the most common reasons kids are referred for mental health care.

Barr: Have you found any correlation with children getting care as young people versus waiting to address those issues as adults? Have you seen any reduction in behavior by adults who got care when they were younger?

Brotman: One of the main goals of my group is to develop brain-based treatments for kids with really severe irritability because we know that the earlier the intervention we have with kids, the better the long-term outcomes. We know from studies that kids who have irritability in childhood tend to develop depression later on as young adults. They tend to have poor socioeconomic status and academic problems, and in fact there's some research that indicates that kids who have really severe irritability have an increased risk for suicide later in adulthood. Getting early intervention and understanding what's going on with these kids can really target a profound public health interest.

Barr: Will you please discuss how the COVID-19 pandemic caused you and your team to have to pivot your research on anger and irritability in children and adolescents?

Broman: Absolutely. Prior to COVID-19, we had a clinic where we were seeing kids with really severe anger and irritability. We were bringing them into the clinic at OP4 [Behavioral Health Clinic] on the Bethesda campus. We had a group of kids that were actually doing psychological treatment where we would be meeting with the child and meeting with the parent, and having the child develop skills to deal with their anger and emotion regulation dysfunction. When COVID-19 happened, we immediately had

to pivot to having our treatment done remotely via telehealth. This was interesting and tricky because when we had developed the treatment paradigm, all of our work had been done working with the child and the parent in person. Particularly with children, there is a really key non-verbal component of communication. One day to the next we went from working with kids, drawing with them, having crayons there, being able to look at them and get underneath the table and work with them, to having a video and looking at a screen. It was tricky to adapt. At first, people were not even particularly fluid in communicating via the video conference. Working with our kids in the beginning, a lot of times they wouldn't even be sitting in front of the camera—they'd kind of be walking around or their face would be hidden. So, part of it was just developing skills on getting a kid engaged and talking to us over the video. We started to develop ways in which we could be doing games or engaging the child while both looking at each other over the video camera—if there were some type of images we could share over our platform or talk about or sharing photos and discussions—to kind of get them to sit in front of the computer and orient to us and engage.

Barr: How long are your sessions? You see multiple ages from very young to adolescents. How long do you spend with each child in a given session?

Brotman: So, it does relate to the child's age. The younger the child, the shorter the time with the child alone, and often a bit longer with the parent and child together. For kids on the younger end, say eight or nine, we'll typically meet with the child for about a half hour and then we would meet with the parent for say another 45 minutes. When the child tends to be older, more pre-teen or teenage, the session with the child can be a bit longer—upwards of 45 to 50 minutes—then the meeting with the parent can be a bit shorter, more like 20 to 30 minutes. However, we found with the younger kids over COVID and over telehealth, that the parents oftentimes had to be present during the session that much more to keep the child oriented and talking to us and engaged and making sure they just stayed in the room. Over time, we started to develop skills to continue to maintain the child's attention.

Barr: What were some of the strategies? Can you speak more about keeping the kids' attention?

Brotman: We all became very nimble at sharing images and graphics over telehealth. Some of the therapeutics strategies we use in the kids with severe irritability involve having them talk about experiences whereby they got very upset. Or draw where they feel anger in their body. In session, we had paper and crayons and colored pencils and markers, but when we started to pivot to the telehealth, we would use a white board, whereby the child could draw with the mouse themselves or we could pull up pictures of different people's face emotions and say, "Did you feel more like this or more like that?"—really leveraging modern, mobile technology to engage the child and meet them where they are.

Barr: Did you speak with your colleagues at NIMH and other mental health professionals, who were going through the same things, for ideas of ways that you could be interacting with your very young patients?

Brotman: We did. We were talking with lots of other collaborators, and we were all trying to figure it out in real time. Prior to the pandemic, we would be gathering behavioral data, whereby kids would come on campus and either play a game that would assess some type of psychological process, like ability to label face emotions or ability to tap working memory. Of course, when COVID happened, we could no longer do those types of tasks on campus. So, [to help us continue to engage with the patients] what I developed was a mobile app that we could have the children be playing at home, such that we could still

be tapping these psychological processes, but we basically brought the task to them. We pushed it to them after getting their consent and IRB [Institutional Review Board] approval. We could still see how kids were doing on some of these cognitive tasks while at home during the pandemic—and not having to come in to do these specific paradigms.

Barr: Can you talk more about the creation of this app that you've produced?

Brotman: Absolutely. If you're to think of kids with irritability as displaying episodes of anger or temper outburst, when you think of a temper outburst, what does it look like? Basically, a child gets angry. They often feel the need to want to break something or clench their fists or get angry in some way and show it in their body. In fact, when you look at the psychological process, kids who tend to show higher levels of emotion dysregulation have difficulties inhibiting a motoric response—that is, if they're trained to do something on some type of motoric response and then have to change it or stop it, it takes them a little longer. This is called inhibitory control, and you can measure inhibitory control in the clinic by having a child play a computer game or be doing a task inside the scanner whereby they're executing a certain motoric response. Then they have to change the motoric response or not do the motoric response. Basically, what I did was I created a game which essentially probed inhibitory control on the phone on an app. The response was we had the child swipe. It took place in a galaxy, and kids had to swipe certain planets and comets with their finger, and then not swipe certain stimuli—a star. Most of the time, on the visual display, they would see these comets or planets and rocks that they're supposed to swipe and that were certain colors—but then if they saw a star, which was basically a yellow circle in the galaxy, they aren't supposed to swipe it. It'll be swiping and swiping and swiping most of the time, and then not have to swipe the yellow star. What we did was we had kids playing this game, and we could see the extent to which they had difficulty not swiping that yellow circle. So, they'd be swiping and swiping and then have to not swipe, and we just actually started analyzing data from about a hundred kids who played this game during the pandemic. We're seeing that in fact, as we had expected, kids with higher levels of irritability tend to have more difficulty inhibiting that motoric response or not swiping that yellow star when they don't want to.

Barr: That's really interesting. What do you do to get them to have better responses?

Brotman: That's a great question, and actually that's the next line of research that we're starting to brainstorm now. Is there a way whereby we could train kids in some way to teach them to have the skills to inhibit that motoric response, possibly in some type of app-based way or in some other way, and would that actually translate in decreasing irritability and physical displays of anger, such as a temper outburst?

Barr: Can you talk about how you went about developing this game and who you worked with at NIH in terms of IT [information technology] and how you ensured that the transfer of data is secure?

Brotman: Yeah, absolutely. It was a really interesting effort. I worked closely with the contract team here and wrote a contract and described basically what the needs were in terms of the game—what we wanted it to do and how we wanted it to unfold. We interviewed many different companies to see who might be able to complete the job. We talked with William Hermach, the ISSO [Information System Security Officer] in NIMH, to ensure all data security. All of the data was being stored in a highly secured server. We got it IRB approved. I worked closely with the contracting company who had experience developing mobile apps. They helped execute the vision of what we wanted the game to look like. For a while, we were having research assistants testing it. I played it a bunch of times to see what was working

and what seemed kind of glitchy. Then ultimately after trying it out for a while, we were able to call families that were in our study, explain it to them and see if they'd be interested in doing it—and talking to the kids to see if they wanted to do it. In fact, most of the kids were really eager to do it and thought it was quite fun.

Barr: Have you noticed that the pandemic has exacerbated emotions in children that you treat, and if so, what has been the main reasons for their discontent?

Brotman: That's a really interesting question. One thing that has been really salient to me in continuing to monitor how the kids are doing over the course of the pandemic is how it's ever evolving. Even over time, the clinical symptoms are changing quite a lot. Just to be really specific, at the beginning of the pandemic, we actually found and were collecting these data remotely, as well as using a smartphone-based app to get a sense of how the kids were feeling during the pandemic, but we found in the beginning that a lot of kids' levels of anxiety changed depending on what their anxiety was about. Kids who had anxiety around going to school or social situations—their anxiety tended to start to come down a little bit at the beginning of the pandemic because they weren't having to go to school; they weren't having to separate from their parents; they weren't having to leave their home. Whereas kids who had anxiety about safety or medical things, as you might expect, were very concerned about the COVID and the impairment and disability that was associated with COVID and getting sick. We also found in looking specifically at kids with irritability and anger, that in the beginning of the pandemic when people were home doing school via Zoom and with their parents all day and then in their house doing school all day, that the level of discord within the family environment started to creep up. Again, if you talk to people, that's really consistent with what a lot of people experienced when their kids were home all day and then had to be on the computer to do school. Then we start to see a kind of leveling out. Some of the studies that we're doing now are looking at imaging brain data from kids who completed tasks in the scanner right before the pandemic. We want to see if there's anything that we can identify that was going on in the brains of these kids that are associated with those who are more or less likely to develop psychopathology during the stress of COVID-19. We're just starting to analyze those data now.

Barr: Were you worried that some of the children that you were treating regressed in some of the skills that you had been building up, because it was kind of a chaotic, non-normal environment?

Brotman: It was very chaotic—very chaotic. Our main priority when we started to switch over during the early pandemic was to make sure that our clinicians and those who were under our care were able to connect with us and we were able to continue to provide treatment regularly. I think having that stability with the clinician was helpful and it was important to us that we could continue that continuity of care.

Barr: In addition to the galaxy game, have you created any other games, or do you have plans of creating any games?

Brotman: Yeah. I don't know if I would call it as much a game, but kind of leveraging technology. During the pandemic, we used phones to assess kids' clinical symptoms during the course of the day. Classically, when you think of how you assess psychopathology in children and adults, you think of a clinical interview whereby the clinician would ask someone what symptoms they're experiencing, or self-report measures whereby there's a form and someone answers about their levels of sadness or anxiety over the past week and where a parent will answer for their child. What we developed was something called ecological momentary assessment or EMA. It's a way to digitally assess clinical phenomena in real time.

So instead of having the participant think about the past week and how their mood was, we would push notifications to their phone for them to rate their mood during the day. We would have the kids rating their mood three times throughout the day: in the morning, in the middle of the day, and before they went to bed. We would also ask them things that they were worried about that might happen or things they might be upset about, or how much sleep they had the day before or if they were feeling hungry. We could really get this incredibly rich clinical picture of the unfolding of the mood throughout the day. In terms of what we're working on now, I'm trying to make this EMA—this digital based phenotyping— more engaging. What we had before was questions that were pushed in a text form, and then a child would rate one, two, three, four, or five. Then there would be a series of questions. What I'm doing now is having kind of "temperature ratings" where you can move a curser up and down to identify how angry you are at the moment or how scared you are at the moment. It's this more exciting interface graphic where it clicks when you push the next button and there are different pictures, so it's more engaging for the children in the early focus groups we've had in starting to test it.

Barr: How do you design your resources for such a variety of ages? They have different levels of understanding and reading abilities.

Brotman: We want to make sure that the kids are able to understand the questions, so we use language that at least a nine or ten-year-old would be able to read and understand. Once a nine or ten-year-old can understand it, we know a 15-, 16-, and 17-year-old will. The other thing I found is that engaging and fun graphics capture everyone's attention. I found, perhaps surprisingly, that many of the visual stimuli that are appealing and engaging to a 10-year-old are equally engaging to young adults. Even when I'm playing it and looking at it, it's fun for me. As long as we're making the visual engagement fun and the colors bright and the questions clear, it's able to access a wide variety of people.

Barr: Do you think that adult forms will do more graphics based on what's been done with children because even adults have trouble putting things into words?

Brotman: Absolutely, absolutely. Particularly as people are using and relying more on digital health and mobile phones, graphics and engagement and being able to answer questions clearly—and that being aided by visual phenomena—has been really, really helpful. In the next generation and wave of psychiatry we're going to lean more into digital therapeutics of assessment and possibly even intervention—to really use the technology we have at our fingertips.

Barr: Did you find that people were more willing to share in their home environment and on their own terms using these digital apps than they would be in your office, or have you not been able to notice a difference quite yet?

Brotman: That's a really interesting question. I'm not sure. What I have noticed just over the course of our telehealth visits from the beginning of the pandemic to now, is that people feel much, much more comfortable engaging with technology and having clinicians basically talking to them while they're in their home, as opposed to them coming into the clinic. I think that space is starting to broaden in terms of interacting with people where they are, but I'm not sure. In some ways, it's helpful to have kids in their home environment when they're trying to get a sense of these really complicated emotions, because it's salient to them. They have a sibling nearby or a toy they really like to play with that they're not able to play with. Having those kind of stimuli nearby can often help remind them in terms of things that they may have been upset about that they may not be able to remember if they came into the clinic on campus.

Barr: Are there things about not seeing people in person that you really miss?

Brotman: Oh, absolutely. Particularly with children but with everyone, we know that a good portion of communication is not the words you say but is non-verbal. Working with kids and just being able to see their face on a screen, there's sometimes things going on in terms of their body language that are just harder to get a handle on when you're over a telehealth session. If they're fidgeting a lot, you might not necessarily see it or if their body language seems more small or withdrawn or sad. I would say that's kind of a skill the clinicians and I have started to develop over time—really being able to hone our reading of some of those nonverbal cues that we're used to seeing in the three-dimensional space and starting to see it in a two-dimensional space over a monitor.

Barr: Your department does so much with technology. How do you keep up with all the innovations with technology, particularly in medical gaming?

Brotman: I read a lot, so I've gotten into that again, particularly during the pandemic when our resources of being able to get information from children were limited. I wanted to think of some other ways, and so I've really been reading more and more about the incoming age of digital assessment and therapeutics. We still have a very long way to go, but the pandemic—at least for me—forced me to think outside the box of other ways we could be gathering clinical data and probing various behavioral deficits such as motor inhibition.

Barr: Do you look at the gaming field in general? I feel like medicine's always behind other kinds of technology that people do for different reasons. Do you look to that as well as inspiration?

Brotman: Yeah, I do, more from the perspective of the gaming devices and the kind of controls and interface that people have. One of the things I've noticed is how realistic some of the graphics have become and how we can use that in thinking about the future of virtual reality and how that might be able to help us in working in the future. Again, it's early days, but seeing what's out there is really quite remarkable.

Barr: Do you ever hope to create a game at some point where somebody in your department would play with the child who's being assessed, either being clearly identified or versions where they're an avatar and sort of analyze the differences in reaction of the children?

Brotman: Yeah, that's definitely a new wave of how people are starting to think about these kinds of interventions—kind of augmenting a clinician being there and interacting with some type of other graphic or VR [virtual reality] capability. It's really exciting. I'm just starting to dip my toe in the waters of it.

Barr: In addition to being a clinician and a scientist, you're also a person who's been living through the pandemic like everybody else. What are some personal opportunities and challenges that the COVID-19 pandemic has presented to you?

Brotman: I would say one of the largest opportunities was being forced very quickly to think of new ways to answer research questions in a creative way that we could gather the data in ways that were accessible. One of the bigger challenges has been running a lab remotely and having a team that I'm working with. But I've not actually met many team members in person. Running a lab and having that

sense of community within a lab environment and having some staff starting and having not met them in person has been a bit of a challenge, but it's something that, again, where we're trying to also think of creative ways to have and build that sense of community. It's been a challenge, but it's also been fun.

Barr: What are some of the ways that you've tried to foster that sense of cohesiveness on your team?

Brotman: One of the biggest changes of not working on campus is you don't have time to just walk by someone's office or cubicle and chat or have coffee. One of the things we started doing was having coffee chat times whereby we'll just all be in a Zoom room together. We don't talk about anything work related, but just catch up and try to fill in those down times that we're missing with Zoom meetings all being back-to-back and business [focused]—having that downtime just to check in and see how people are doing, see how people are feeling, and kind of get that water cooler downtime talk that you'd get over coffee when you're in the same physical space.

Barr: How have you supported your team? It's been very hard for many mental health professionals at this time because they're dealing with situations themselves, plus the burdens of their clients that have been exacerbated by the pandemic. How have you encouraged them to help take care of themselves and their mental state?

Brotman: NIH has been a huge advocate in support of people taking care of themselves first. We've really encouraged people to disconnect, take the time they need, and engage in self-care—whether that's going for a walk, watching a movie, reading a good book—taking time away to really disconnect and focus on themselves so that people don't feel like they're just in front of the computer all day, every day on Zoom meetings or responding to email. That's been really important. Having these check-in times with people and having a really open sense of communication among the team—and knowing that it's okay to have tough days and that you can take the time you need and then come back. We're all kind of better for ourselves and each other if we're taking care of ourselves.

Barr: Is there anything else you would like to share about your COVID-19 research and experiences?

Brotman: It's been a really interesting time and I'm really glad you're compiling all this information. It will be really, really interesting to look back on this time and see how the science has evolved and how the science has changed, and what opportunities this time has provided researchers to think about things in different ways. Seeing how NIH has been supportive in the researchers being able to continue to pursue their questions has been really, really rewarding.

Barr: That's wonderful. I wish you and your team continued health and continued success. I look forward to seeing how the games develop over time.

Brotman: Thank you so much. Thanks so much for your time. I really enjoyed chatting with you.

Barr: Absolutely. Thank you.