**Memory Reconsolidation, Emotional Arousal, and the Neuroscience of Enduring Change: Implications for Psychoanalysis.**

**Lecture 12**

**(6/20/23)**

This is the final lecture, lecture 12. I was thinking about the question of psychotherapy coming to an end, and isn’t that a difficult transition? The same applies here. It’s been a very intense, and great experience. I want to thank all of you for your interest in the course and thanks to all the sponsors for making this course possible.

I thought it would be useful to review all the material on the course, because we really covered a lot of ground, and it's an interesting exercise to try to knit it all together. There’s also the possibility that this lecture will be a summary paper that we might publish. So, how to review the course? I thought a summary of greatest hits from this lecture series. You’ll hear about the internal working model, the implicit process of relational knowing, memory reconciliation, the role of sleep-in memory reconsolidation, computational mechanisms, predictive processing and active inference, defenses and deficits, transformation of intolerable to tolerable emotion, and the role of understanding and new experiences. With that background it will then become clear what the role of psychoanalysis is in relation to other modalities. I thought it would be useful to make a little list of things that I've learned teaching this course, specifically things that I didn't really appreciate or understand when the course started.

An overarching idea about this whole course and fellowship is that Freud had a dream of a brain-based understanding of the mind. It wasn’t possible in his day to pull that off, but a century later we think we can. I have this picture of the Arizona sunset to remind you that mechanisms make a big difference. You can talk about it in psychological terms. We can talk about it in neuroscientific terms, and subjectively, phenomenological terms. Freud said, “biology is truly a land of unlimited possibilities. We may expect it to give us the most surprising information and we cannot guess what answers it will return in a few dozen years to the questions we have put to it.” (Freud, 1920, p60). This is a century later. We can really connect what we're doing now to what Freud said, but a lot has changed. It is very important that we put this on a strong empirical foundation. The purpose of the course has been to put psychoanalysis and psychodynamic psychotherapy on a stronger empirical footing based on neuroscience. This is needed because psychoanalysis rejected empirical research for many years and has lagged. However, also, in fact, many classic psychoanalytic claims can’t be falsified, as we talked about in terms of trying to validate that there are unconscious processes that are defended against; it's hard to demonstrate those. Moreover, insurance companies and consumer’s demand empirical evidence. Cognitive Behavioral Therapy (CBT) is now dominant, and psychoanalysis is in decline, certainly in the United States. Although it’s now known that psycho dynamic psychotherapy is effective, the mechanisms of change are needed to demonstrate why it works. Creating a working model of change that can be updated as new knowledge becomes available is also essential.

Of course, the kind of foundational idea in the course is memory reconsolidation. As we know, this was only proven and widely accepted in the scientific community in the year 2000. A century before, Freud was the very first person to describe it. He called it memory re-transcription and he said that patients suffer from reminiscences, thinking in terms of trauma, and the effect that has. They don't recognize the connections between trauma experiences and the symptoms they have. His concept of memory was a typical one, which is that we think about memory as a record of the past. Not thinking about it as a guide to the future, which is a critically important link to computational neuroscience and predictive processing. Memory is adaptive because it keeps a record of what did and didn't work in the past. The key benefit is that it serves as a guide to similar situations in the future. In fact, the brain is constantly making predictions about what is happening now, and likely to happen soon based on these memories. Having some capacity to update memories considering changing circumstances, can optimize adaptive flexibility, but changes must be made prudently. It’s not easy to pull off memory reconsolidation for therapeutic purposes.

Okay, so we're talking about how to bring about change in psychotherapy and in psychoanalysis. We're also talking about bringing change in memory, emotional experiences, and their interaction. That doesn’t align extremely well with our current psychiatric nosology, which is based on symptoms and behavior, not etiology or mechanisms. Let’s use the example of a cough as the equivalent of a mental disorder that we treat. A cough is an observable symptom with many different etiologies. For example, we have post - nasal drip, asthma, acid reflex, pneumonia, lung cancer, etc. Depression and anxiety similarly are symptoms, like cough as a symptom. It doesn’t say anything about etiology. Our nosology and specific disorders are defined by a list of symptoms, and successful treatment is conventionally defined as symptom reduction. Psychodynamic psychotherapy and psychoanalyses aspire to get to the root cause of the symptoms because symptoms arise when the usual pattern of adaptations fails.

Let’s talk about CBT which is the number one psychotherapy in the world today. It’s the most popular method. CBT focuses on reducing symptoms or maladaptive behavior. It focuses on what maintains symptoms, not their origin. Patterns in social relationships (i.e., the internal working model) are not a major focus of CBT at all. CBT treats emotions as a symptom, like anxiety and depression, not a mechanism of change. Inhibiting symptoms, for example with exposure therapy and extinction, and learning alternative behaviors are our primary focus of CBT. Memory reconsolidation doesn't fit with CBT very well. In fact, enduring change in CBT for depression is about 30% in 2 years. Roughly a 50% response rate and 30% to 40 % of those patients relapse at 2 years. Now we know that CBT has a very strong scientific foundation. That foundation originated in the conditioning literature which you know is well validated in animals.

We have classical conditioning which involves the pairing of condition and unconditioned stimuli. Animals have a kind of limited time scale that they operate in. They are learning about threats, and they're learning about what's rewarding and what's a danger. We are animals, too. We have those mechanisms in us too. Dr. Orval Mowrer talked about the factor model of avoidance learning which I think is instructive. Let’s think about the example of someone who was assaulted in a parking lot. By virtue of conditioning, the parking lot and the assault are associated and induce fear. The idea of going out to a parking lot would immediately cause fear. Classical conditioning leads to extinction unless pairing is repeated. Therefore, how can classical conditioning explain clinical anxiety? The other kind of conditioning, operant conditioning, includes both positive reinforcement and negative reinforcement. Negative reinforcement involves avoiding something negative and by doing that, relieves and reinforces the stimuli. For example, by avoiding the parking lot where the assault occurred, that reinforces the conditioned stimulus association. The combination of the two can explain clinical anxiety.

Recurrent maladaptive patterns are a different animal if you will. These patterns are foundational in psychoanalysis and psychodynamic psychotherapy. Their patterns of behavior that aim to meet needs while avoiding intolerable distress. Consequentially, negative reinforcement is potentially relevant. It is playing a role in their persistence because of the avoidance. The avoidance also limits adaptation. It is these patterns that we're trying to treat. Recurrent maladaptive patterns are ubiquitous. If you’re doing CBT, you may not be paying attention to them, but they're still there. Other psychotherapy modalities don't attend to them. Therefore, psychoanalysis and psychodynamic psychotherapy offers something of unique value. I realized that when we're talking about the internal working model and recurrent maladaptive patterns, it's something that's uniquely human. We can understand that when we think about the evolution of the human brain and how different it is from our other evolutionary relatives. Disproportionate cortical expansion during human evolution reflects additional hierarchical levels of computational processing, allowing representation of multimodal regularities over longer time scales. These representations make possible abstract concepts, learning, internal simulation of distal future outcomes, and expanded working memory capacity.

Schemas are a new knowledge structures that reflect abstracted commonalities across multiple experiences exerting powerful influences over how events are perceived, interpreted, and remembered. The internal working model of the social world is a schematic memory. It was created by abstracting commonalities across interpersonal emotional experiences. The capacity to form an internal working model of the social world is uniquely human. We’re operating at a high conceptual level. We automatically abstract these regularities, and in psychoanalysis, we talk about concepts like conflict, defense, and fantasy.

There was an important change in psychanalytic thinking in the early 2000s with the Boston Change Process study group. They raised the question: how can we take advantage of newer insights from relational psychodynamic psychotherapy in which the inner subjective emotional field is the focus of the therapy. I think that they talked about the implicit process of relational knowing which, I think is the operational expression of the internal working model in action. They said that lived experience is represented at the implicit level. The implicit process of relational and relational knowing involves what is expected regarding what other people will say and do, how you will feel, how you're expected to behave, and how events typically unfold. This is the internal working model in action in real time. This view is consistent with implicit emotion as continuously active in the background, guiding behavior. In other words, we're having emotional responses that we may not be aware of, but they're influencing our physiology and our behavior. *The lived experience of interaction with other people is where development occurs and where change happens.* This is probably the single most important line of this lecture on this course. It's all about using this natural mechanism of recognizing commonalities and recognizing that there's such a thing as memory reconsolidation and emotion-memory interactions. We're using these natural processes for optimal clinical benefit. So, concepts of conflict, defense, and fantasy are abstractions that are higher level constructs that are super imposed upon more basic, and implicit automatic level of lived experience. I think this is a way of understanding the difference between the approach that I'm advocating and Dr. Mark Solms’ classic approach. Using this higher level of abstraction is a way of understanding recurrent maladaptive patterns. A diagram of different types of triangles

Description automatically generated Figure 1. Karl Menninger’s triangle of conflict on the right-hand side, is interpersonal and the triangle of insight on the left side, is also interpersonal.

We can use the example of Becky. Her hidden feeling was that she was afraid of rejection, and as a result she did her best to be perfect and to please everyone so that she would be accepted and loved. When she was implementing this approach with her boyfriend, and he wasn't as responsive, she felt rejected and distressed. There was a destabilization and the typical pattern of symptoms arising from a destabilization of this pattern. This arose because she learned that she had to take care of her parents, and her parents were less interested in having her talk about what she needed. She applied this to her boyfriend naturally, and the therapist was expecting that, she'd be a very good patient, and try to please the therapist. This is an initial way of kind of grasping what's going on. This triangle of insight, I think, is a way of really understanding the critical importance of interpersonal processes and psychodynamic psychotherapy. Hannah Levenson really makes this very clear in her book. Problem starts in the context of relationships and the family of origin. People seek help because they're having problems in interpersonal contexts (social and occupational). Problems get resolved in interaction with the therapist working with affect and creative corrective emotional experiences.

So that brings us to the memory reconsolidation perspective. We've highlighted the fact that memory re consolidation is linked to enduring change. If you can really change the memories and the predictions, then you're not prone to relapse. When it comes to classical conditioning and extinction, the UCS & CS pairing is still there. This pairing is inhibited by extinction, so there's that vulnerability to relapse. If you really change the internal working model, then you won't be as prone relapse. That is the basic idea.

We said that there are 3 essential ingredients for enduring change: 1) You must activate the old memories and the old feelings, with or without awareness of their connection to the past (as in a transference response). 2) You must concurrently engage new emotional experiences that change old memories through reconsolidation. 3) Finally, you must reinforce the strength of new memories and semantic structures by practicing new ways of behaving and experiencing the world in a variety of contexts. One of the reasons why it's important to practice is that these old memories get reactivated and put into a labile state. The way you deal with them really matters.

A diagram of a structure

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Figure 2. Integrated Memory Model

We then talked about the integrated memory model, which is a core part of the 2015 paper[[1]](#footnote-1). In this paper we specified episodic memories or personal experiences, semantic structures or generalizable knowledge which would include schematic memories and emotional responses.

It’s impossible to activate one without the others. A core mechanism of change is that you have these semantic structures and schematic memories. You have specific experiences in the therapy that are emotionally charged corrective experiences that will update the schematic memory. We put a lot of emphasis on emotion. There are good neurobiological reasons for that.

Emotional arousal enhances memory and encoding. Synaptic plasticity which is the molecular basis for encoding memories is enhanced by the neurotransmitters and hormones, norepinephrine, and cortisol, that are activated by emotional arousal. Identifying and tagging was important to remember is a foundational principle of memory functioning. What gets tagged during the day gets transferred into long-term memory at night. The brain cannot possibly retain all the information that comes in during the day, nor would it want to. The brain needs to remember what’s important and integrated with what's already known. That is the arousal component. There’s also the appraisal component of emotion which determines the content of updating. Understanding this from a predictive processing standpoint is helpful. We know the arousal component facilitates encoding, the appraisal component determines what is encoded and determines future predictions, which are critical to social perception. Your expectations are based on the experiences that you've had. When you have a corrective experience that will update the schematic memory, that will be the basis for your predictions going forward. The corrective experience has both components. which means that corrective experiences directly change future constructs without the need for explicit interpretation or conscious understanding. That is foundational and super important in relation to how psychoanalysis is typically practiced which is focusing on interpretation and making the unconscious conscious, explicitly.

Now, sleep is very important in this whole story because memory reconciliation happens during sleep. Memory systems are reorganized during sleep in the consistent patterns or schemas. It’s not just when you're in psychotherapy that this applies, it applies in general. This organization about integrating the new with the old is consistent with reconsolidation. Sleep preferentially selects what is relevant to a person. We know it's been tagged during the day. That is what emotion is. It’s a system for determining personal relevance and responding as needed. The way the brain sorts and saves information during sleep in general roughly approximates the proposed mechanism for enduring change in psychotherapy. That is, new emotional experiences update previous schemas. I thought it'd be useful to review this work on overnight therapy by Matt Walker, “Sleep to forget, sleep to remember, why, you usually feel better in the morning.” Coordinated encoding of hippocampal bound information within cortical modules facilitated by the amygdala modulated by high aminergic concentrations. We have the amygdala. Here, the hippocampus, the cortex. Hi, I'm Anj activity, local andergic activity. A lot of emotional tone here. Okay. now, during round which is here the same structures are reactivated by synchronous data oscillations throughout these networks. You see here. supporting the ability to reprocess previously learned emotional responses. Okay? So, we’ve got the amygdala, active at the campus and cortex during run. But there’s a change here in the neurochemical environment. The milieu of REM has change, resulting in deep potentiation of effective tone and progressive neocortical consolidation of the information reducing the emotional tone. Stronger cortical-cortical connections support integration into previously acquired autobiographical experience, aiding assimilation of the affective event with path knowledge, which may contribute to the experience of dreams. This is consistent with the whole argument about what's happening during sleep, and how emotional memories get reconsolidated. A diagram of a diagram of a diagram

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Figure 3. Relationship between physical and social space within memory.

The hippocampus is such a major structure in memory. It’s highlighted here (above). We've been talking about how the hippocampus tracks special spatial relationships concretely and conceptually. Physical space and social information in physical space, and then social space. We know that the hippocampus is tracking the dimensions of power and affiliation. It's tracking how close you are to another person, for example, and that is really getting close to the internal working model and the therapeutic relationship and potential changes in connections in the therapy relationship and with other people. It's not just purely really, abstractly that we're talking about neuroscience. We have the potential to really hone in on it with neuroimaging.

There’s this fascinating aspect of dreams that link to computational processes. It's the concept of over fitting. Over fitting occurs when a statistical model fits a training data set exactly but can't generalize to a different data set. All deep neural networks face the issue of over fitting. This ubiquitous problem in deep neural networks is often solved by experimenters via noise injections in the form of noisy or corrupted inputs. This paper by Dr. Eric Hoel[[2]](#footnote-2) argues that the brain faces a similar challenge of overfitting, and that nightly dreams evolve to combat the brains over fitting during its daily learning. Dreams are a biological mechanism for increasing generalizability. Sleep loss and specifically dream loss leads to an overfitted brain that can still memorize and learn but fails to generalize appropriately. Sleep disruption of PTSD would be highly consistent with that.

The internal working model and recurrent maladaptive patterns can be understood from a computational perspective. I think it's useful as we go through this to really understand this, because it's not just an analogy. This is maybe how it works and why the things that are being recommended are being recommended. So computational neuroscience is the leading model for understanding how the brain processes information. Understanding the mind based on fundamental principles of brain function increases the likelihood that newer psychological conceptualizations will have enduring value. Recurrent maladaptive patterns in their treatment can be reconceptualized in these terms. Putting psychoanalysis and psychodynamic psychotherapy on a stronger empirical footing may ensure their survival and potentially reinvigorate their standing in the mental health field.

An important concept is that emotional distress is an expression of prediction error. The internal working model really provides a set of predictions in social situations and in computational terms. We talk about predictions as priors. The brain is always seeking to minimize prediction errors or minimize expected free energy. Distress in social contexts can be understood as prediction error. Emotional responses are activated by an automatic, usually unconscious evaluation of the extent to which needs, goals, or values are being met or not met in interaction with the environment at that moment. The set point for that evaluation is a prediction of what you expect to experience. A deviation from that set point activates an emotional response (something which your needs, goals or values are met or not met). Distress indicates that needs are not being met at that moment, therefore distress is an expression of prediction error. Computational neuroscience is helpful in explaining recurrent patterns and the need for more emotion processing to update the internal working model. Prediction error can be minimized in one of two ways: you can update the prior, or you can change the sensory input so that expectations are accurate. Updating priors in this context is not easy, it means changing the internal working model. This is a schematic memory built up over time which is not easy to change. Updating the prior requires updating it based on prediction error which means attending to and working with prediction error, or distress. In computational terms, we want to increase the precision of that distress. We want to call attention to it. It's more likely to influence the prior. Recurrent maladaptive patterns can be understood to rise as an expression of the second option: taking actions to ensure that the predictions are met. That is active inference. If you’re expecting people to mistreat you, and they're treating you nicely, you don't trust it, so you'll test it, and you might get them to mistreat you again, and then all as well again. It’s maladaptive, but at least your prediction error is resolved. By repeating the usual behavior pattern and ignoring the stress that it generates (which is familiar), prediction errors are minimized. Remember, this is the avoidant component. Defenses are a critical part of the recurrent pattern. Successful psychotherapy involves updating the prior and updating the internal working model by incorporating the information provided by the prediction error by the distress which involves identifying the associated needs and finding ways to meet them.

What keeps recurrent maladaptive patterns in place? Why is painful emotion avoided? There are lots of reasons. Well, it’s unpleasant. We prefer to avoid attending to the stress unless it's necessary. Or you may not think that emotions have value. Or you don't know that the bodily sensations that you're experiencing at the time are due to emotion. Or you don't know the source of an emotional experience, so you don't attend to it. Another important one is that certain emotions are forbidden to express or even experience. That’s an important one. We saw with Becky, she wasn't really allowed to speak up and have her needs addressed. Her family of origin is another reason why painful emotion would be avoided. Well, we often need another person to make sense of our own experience. We may need the support of another person to help tolerate the painful emotion. To do that we need to have faith with the other person to be helpful. We may not always have that belief. You need to feel confident that you can survive if the worst happens. If you get in touch with your emotion and you act based on that and that action results in what you're fearing, you must be able to withstand that. For example, if you're afraid of rejection, and you stand up for yourself and you get rejected you must be able to tolerate that. You need to be able to transform intolerable to tolerable emotion, which is a key aspect of what this is all about.

This gets into the fascinating issue about defense and deficit. There is a need for emotional growth in the context of our current maladaptive patterns. Our current maladaptive pattern arises and persists as we said, because of the need to avoid intolerable emotional distress. Defenses are deployed automatically because it is sensed that the consciously experienced emotion or conflict would be overwhelming. That's part of standard psychodynamic psychoanalytic theory. So, when inflexible avoidance strategies don't work well, the stress is experienced which brings people in for treatment. The pattern is persistent, and thus recurrent, because there is a limitation in processing capacity making avoidance necessary. As such, although defenses or a void of strategies are present and need to be overcome to make behavior and adaptation more flexible, a certain kind of emotional growth is needed. Defenses will remain active as long as skill limitations and deficits persist. I think these ideas about the need for emotional growth above and beyond overcoming defense is going to be the hardest thing for psychoanalysts to understand because this is so deeply ingrained that we can understand emotions based on defense. If you have defense, you overcome it. That's it. But how do you overcome it? And why is it in place? And why is it in place for so long?

Okay, so integrating defense and deficit accounts of reduced emotional awareness. Psychodynamics fundamentally refers to the influence of unconscious mechanisms on behavior. Something can be unconscious because it is actively kept out of awareness. This is defense and what Freud talked about exclusively. He only dealt with mental contents that have previously been mentally represented, actively inhibited, and kept out of awareness through repression and other defects. The other option is that mental contents fail to reach conscious awareness due to a deficit (a failure to construct in the first place). There are three propositions: 1) First, is that the nature of defense maybe based on whether something has been previously mentally represented, constructed or not. 2) For immature defenses, defense (motivated avoidance and deficit, impaired mental representation), may be inseparable. 3) The defenses are more likely when deficits are present. You're more likely to avoid something when you have no idea what it is.

Now we have this familiar contrast between defense and deficit offenses.

A group of men digging a treasure chest

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Figure 4. Freud's model of a buried treasure.

Freuds beautiful, buried treasure (above) represents actively hiding or keeping something old out of mental awareness, and slowly bringing it to the surface. It was fully formed in its unconscious state and now you're just removing the defense. The alternative is that you're finishing something incomplete that was not previously mentally represented. You're formulating something new and you're bringing it to a higher level.

When working with trauma in psychotherapy, I like the analogy of physical therapy. You have restriction and range of motion. In psychotherapy we have a restriction range of e-motion. In physical therapy you have a previous injury and inflammation that restricts the range of motion. We have previous injury, and in trauma, things that we want to avoid. Physical therapy is a little painful, but it can't be too painful, right? Victims of trauma often know what happened, but not how it affected them emotionally. Emotional experiences need to be formulated for the first time and titrated to what is tolerable. Discussion of past experiences incorporates new information, including the safety, empathy, and support of the therapist. The new context permits the experience of new emotions, experiencing feelings, such as anger, guilt, and longing for the first time that it previously been intolerable and unformulated. It might be typical to think about feelings of anger, guilt, and longing as being defended against. However, the alternative is that they've never been formulated in this context before. If you don't appreciate that there's a deficit there and you keep waiting for the person to come up with it, it’s going take a very long time, and they may never come up with it, which is why you must help them and recognize why such a deficit is there.

So, psychoanalysis is more than the creation of a narrative it's the active construction of a new way of experiencing self with other. The traditional way of thinking about psychoanalysis is, it's the creation of a narrative new understanding. Experiences are important and I've had the pleasure of reading professor Dr. Stephan Doering’s book, “Resonance, Encounter and Understanding.” It is a great way of understanding how psychoanalysis works, particularly with people with severe personality disorders.

When abuse, neglect, or trauma occur in the preverbal period, semantic memories are created that can't be recalled or put into words. There’s a bodily resonance between the therapist and a client that enables the therapist to access these experiences of the client which are often unformulated in the client. What are these means of communication? Projective identification enactments, action tendencies, mirror neurons, the therapist fantasies that may arise for whatever reason but are somehow stimulated by the interaction, physiological synchrony, olfactory stimuli, and emotional contagion are mechanisms of communicating. The therapist contains the arousal and reflects upon its meaning, which informs empathic statements. The therapist is invited to respond in the same way that everybody else responds but the therapist doesn't do that. The therapist reflects on what's being experienced and figures out why this is happening and what the person needs. They reflect statements like, “as we're sitting here, I have the sense that you're afraid that I'm going to attack you.” By saying that, you're clearly conveying that you're not about to attack the person. Instead, you're conveying that you care about them and that you want to understand them. There are all these implicit messages that are transformative and regulatory. Attunement and concomitant implicit messages can regulate and transform client distress.

If we're seeking enduring change, a goal of therapy is to change the internal working model of social relationships. Insight consists of understanding what the internal working model is. Understanding alone doesn't change the working model. Talking about emotions without experiencing and expressing them does not change the emotional elements of the schematic memory. New emotional experiences update the internal working model and thus change how future situations are construed and responded to. Instead of anticipated ridicule, shame, and rejection, the therapist responds with compassion, empathy, and acceptance. The implicit emotional messages inherent in an interpretation may matter more than the words used to promote insight. Insight likely extends the gains achieved from new experiences, because when you can put it into words that makes it cognitively accessible, you can use that in the future. It's certainly not sufficient for change but may not be necessary. However, new experiences, I would argue, are necessary.

We've discussed the corrective emotional relationship, not just corrective experiences. This concept of the corrective emotional relationship retains the primary focus on the transference as the focal point of therapeutic interaction and psychoanalysis. It bypasses the conceptual baggage of corrective emotional experiences that was kind of rejected by psychoanalysts when Alexander Franz proposed it in the 1940s. The corrective emotional relationship focuses on schematic memories corresponding to the recurrent mail that the pattern rather than episodic memories of specific events. It captures and highlights abundant, relevant, implicit as well as explicit emotional processes in the therapeutic interaction. It provides repeated emotional responses and experiences inconsistent with expectation. Old memories and old feeling transference are activated, entirely consistent with how memory reconsolidation works. It makes possible the transformation of schematic memories that are older, stronger, and more differentiated.

Now we can review this comparison of classic, versus integrative approaches to psycho dynamic psychotherapy. The classic model by Dr. Mark Solms incorporates prediction error[[3]](#footnote-3). The classic model is to focus on a procedure or defense. You've learned that the person that you need is unavailable. That is your prediction, right? And so that's what you do. You repeat that action, and you seek out people who are unavailable. That is kind of the defense. The alternative integrative approach is that it's the emotional experience that being defended against that needs to be constructed. If you're feeling like you're being ignored or being rejected, you may compensate for that with the procedure of ingratiating yourself. That's the defense I am arguing to not focus on that. Don't make that more precise. Make the emotion that's being defended against the implicit emotion that's guiding our implicit process of relational knowing more precise and bring that into conscious awareness. Dr. Mark Solms would say that the work must go on within the transference relationship with the analyst. Why do I say that it can be either in the transference or in other relationship. It's because predictive processing is ubiquitous. These schemas are still active and apply to other relationships. The argument is well it's emotionally potent to work within the transference relationship and the here and now in the room. That is true. If you take advantage of things that are learned in other psychotherapy modalities, like emotion focused therapy, and Hannah Levenson’s time-limited dynamic psychotherapy, there are ways of enhancing the emotional intensity and emotional relevance of other experiences, not just those in the room.

The classic view is that you're resolving conflict. Remember what the Boston Change Process Study Group said. This is a higher level of abstraction derived from the level of experience. The integrative approach is to work more at the level of lived experience, to transform intolerable emotion to tolerable by having corrective experiences in interaction with the therapist or analyst. Interpretation is we're trying to make the unconscious conscious. We're trying to create a new narrative. The integrative approach would be to say, we're not trying to promote new understanding. A new understanding is icing on the cake. The cake is the corrective experience, the corrective emotional relationship. Reconsolidation is not possible, Dr. Mark Solms says, because we're dealing with procedures, and you must learn new procedures. I would say, if we're dealing with schematic memories, those can be reconsolidated, those can be updated. What it comes down to is, is it possible to make psychoanalysis more efficient by focusing more on emotion? Maybe it wouldn't take as long and maybe it wouldn't be impossible to reconsolidate if you focus on emotion more because the traditional way is focused so much on understanding and interpretation.

When we talk about different kinds of memory (e.g., episodic, semantic, procedural) procedural memories are the hardest to reconsolidate They may not even be reconsolidateable. Think about what's happening in the brain and how all these structures are so interconnected. For example, the hippocampus is tracking our social network, the amygdala is communicating with the medial prefrontal cortex. These interactions are happening all the time and they're also connected to midbrain cortical striatal system, and action value learning and action selection. This is what we're talking about in terms of behavior. It’s all highly interconnected. If you change how you construe situations, it's going to change how you respond. Active inference tells us that if we expand our emotion repertoire and can now tolerate emotions that were previously intolerable, we can expand our action and behavioral repertoire.

Defining the fundamental mechanisms of change. We have hundreds of different kinds of psychotherapy. Maybe 500 different kinds of psychotherapy. But there is an infrastructure that is common to all these therapies. There are three pathways: 1) Memory consolidation, which is changing the problematic memory, 2) extinction which is suppressing it and 3) new learning where the old learning stays in intact, however you develop new procedures. That's what Dr. Mark Solms is recommending.

Memory reconsolidation may contribute to the unification of the pragmatic field of psychotherapy. It’s not going to explain everything, but here is a list of multiple kinds of therapy that are very different in terms of what they look like when they're being practiced. They all may work through a memory reconsolidation mechanism. For example, EMDR, coherence therapy, emotion focused psychotherapy, psycho dynamic psychotherapy, psychoanalysis, propranolol assisted psychotherapy. This is a common model that would apply to all of them.

What if psychotherapy practice were based on memory consolidation principles? As we know the reconsolidation window stays open for 4 to 6 hours after the session, so arousal, such as exercise or stress after a session, can tag what came before. A nap or sleep can lock in change before these other influences can affect memory and what happened in in the session. Some issues to consider are retreat- style interventions, how long should the session be. We have 45-minute sessions for a reason. It’s very convenient weekly sessions. What's the proper frequency of sessions if we're really trying to bring about new corrective experiences and lock them in? Does it matter whether you have sessions in the morning or the evening? What are you doing after sessions? Should you take a nap? Should you avoid medications that interfere with REM sleep? These are some questions with important implications. In our lecture on the research agenda all these things need to be researched. Hopefully, we will get answers in your lifetime. Maybe not mine.

Okay, so how do we think about all these different kinds of psychotherapy and the place of psychoanalysis. Remember, it was said that maybe psychoanalysis is like a Rolls Royce, and you obviously can't provide a Rolls for everyone. Well, there are hundreds of makes and models. Some are fast, some are slow. Some people are city drivers, other people want to go off road. Some want electric vehicles, others want gas. The number of core operational mechanisms, electricity or internal combustion is limited, but they all help you to get to where you want to go. it matters what your goals are. People are not all starting from the same place, and they're not all going to the same place. Don’t get me wrong, I think there's an important place for CBT. It is very popular because it really helps people and relapse isn't the end of the world, because you can come back for more treatment. That's what people want. People want to feel better, and they're dealing with symptoms. That’s what a lot of people want. But that’s not necessarily the answer for everyone.

Okay, modalities differ in the context they aim to address. Behavior and exposure therapy involves specifically identifiable situations that elicit the maladaptive response (i.e., spider phobia, flying in airplanes, heights, things of that sort). Exposure therapy is good for that. CBT or emotion focused therapy may be helpful in symptomatic syndromes that are temporary disturbances in emotional responses like clinical depression that are not situation specific. We said in the 2015 paper that psycho dynamic psychotherapy is best when there are enduring trait characteristics that are not temporary and are not situation specific. In other words, transcending space and time is in the person. That is my concept of an updated indication for psychoanalysis for personality disorders which are not situation, specific or state dependent. If numerous other treatments have been tried, and they don't work it might be a possibility. Some people just don't like some of these other modalities. I was thinking about Becky, for example. She scored high on the Beck Depression Inventory, so you could do CBT for her depressive symptoms. She also had this problem with her boyfriend. She couldn't talk to him. So, you could have sessions with her about how to have a difficult conversation. That's how a CBT therapist would work, and it might help. Hannah Levenson did something else. She provided the rationale that we can think about psychodynamics on a continuum from time-limited dynamic therapy (i.e., 15 to 20 sessions of psycho dynamic psychotherapy once or twice a week for a few years, to psychoanalysis, which is high intensity, maybe 4 times a week, for many years). All involve addressing a recurrent maladaptive pattern and updating implicit learning with contradictory information. Transforming intolerable into tolerable distress and applying transformative experiences and treatment to the external world means you may need more intensive, longer duration treatments. Especially, when you have early trauma and there's a lack of that systemic trust or the belief that other people can really be helpful. If there are primitive defenses, like projective identification, splitting and association, and when there are mentalization deficits, Freud's model of change in 1895 was a good start. Trauma memories and their associated affects that remained unconscious were the problem. The analyst’s job was to facilitate overcoming the patient's resistance, to enable recall of the memory and affect, and the curative aspect was to experience and express the affect that had been pent up. Assuming the catharsis was the mechanism of cure which we know doesn't work now, it was a good start, and I would say that we now understand this to be step one in the three-step process.

How can we understand some of these other basic concepts that Freud put forward? I think Freud was a pioneer whose work has naturally been extended because we've learned so much since his death in 1939. He wasn't the first person to talk about the unconscious, but he really put it on the map in the context of mental conditions. We now know that unconscious processes are ubiquitous in cognition and emotion. It's slightly different from dynamic unconscious, due to defenses, but that's just another variety in a way of unconscious processes.

He also focused a lot on drive, including libido, death drive, etc. Fundamentally it wasn't a relational way of thinking about emotions, which is, I think what we really appreciate now. Defense is also very important. It is a multifaceted phenomenon that thought, behavior or motion can serve an avoidance function. Very importantly, Freud was a neurologist who defined the concept of Agnosia. Agnosia is a lack of mental representation such that you don't know what an object is, not because you can't name it, because you don't know what it is. Well, the same may be true for emotions and mental states. He never applied that to psychoanalysis, but I think it's a way of extending his legacy. It's another way of understanding why something might be outside of conscious awareness. Transference is an amazing discovery, right? But again, predictive processing is ubiquitous. You can’t blame Freud for not taking it further. He was just a pioneer who broke new ground in all these ways, and now we've extended it to childhood development. He focused on psychosexual development and the Oedipus complex. An appreciation of the pre-oedipal period and early mother - child interactions and their critical role in development that came subsequently. He was the first person that described memory reconsolidation. I think it has a broader role in understanding the whole developmental process and treatment that goes beyond what he appreciated.

He also put dreams on the map. “The Interpretation of dreams” is an amazing book written in 1900. However, Rapid Eye Movement was discovered in the 1950s, and this whole concept of information processing during sleep really helps us have a new view of dreams. He said this was meaningful, and he was right. Psychoanalysis unlocks and restores healthy development of the internal working model by transforming intolerable into tolerable emotion. During sleep, new self-relevant, that is emotionally significant information from the previous day, is saved and integrated. This process is likely universal in the animal kingdom. This really summarizes a lot of everything that we've talked about, these are natural processes.

CBT is fundamentally different about goals, focus and mechanisms. Primitive defenses and lack of mental representation of emotion are inseparable. Understanding how intolerable emotion gets transformed into tolerable emotion is an important new area of clinical research. The current perspective that I've shared with you aligns with the relational school within psychoanalysis (there are 5 or 6 schools, this is the latest one). It bolsters the relational school with a neuroscientific infrastructure with memory reconsolidation, a constructivist approach to emotion and computational mechanisms: predictive processing and active inference. Psychodynamic psychotherapy and psychoanalysis are indicated for the treatment of personality disorders, or if other treatments aren't tolerated or fail. This is something that I really come to appreciate. When I was being trained, it was like, well, if you really want definitive treatment of anything you do, psychoanalysis and everything else is inferior. That's not how we think about it now. How do we justify all the time and effort? It's for these severe personality disorders where nothing else is really going to work.

The hippocampus may be where the internal working model is encoded and updated in interaction with the amygdala and medial prefrontal cortex. I have a new appreciation for the hippocampus. It's what my buddy Lynn Nadel (who coauthored the book with me) has been studying for years. I’ll give you one example of something that's relevant and is new. When I think about arousal in a session, I was thinking in terms of heart rate and physiological arousal. Cortisol also really influences hippocampal function, and that's on a different time scale, cortisol takes 20 minutes to reach its peak. That’s relevant to what's going on in psychotherapy.

Psychoanalysis and neuroscience align as a function of which concepts and findings are selected from each domain. I think that professor Deuring and I have found some convergence between psychoanalysis and neuroscience. It puts psychoanalysis on a stronger empirical footing, reformulating core ideas in an empirically tractable manner. It can reduce the complexity of teaching psycho dynamic perspectives, as well as teaching six different schools and introducing people to all sorts of disagreements within the field. It suggests the need for a greater focus on activating and transforming emotion whenever possible in all transference relationships or predictive relationships with the therapist as well as others. I found myself thinking, how would Freud feel about this new perspective? I’m not sure.

Having a Fulbright fellowship has been an enormous honor. Specifically, being funded by the US government to come to Austria to be an intellectual ambassador. It has been wonderful. To have a fellowship sponsored by the Sigmund Freud Museum was something that I couldn't possibly turn down. Here I am back at the birthplace of psychoanalysis. It's an opportunity to help realize Freud’s dream. I also really had enormous support back home at the University of Arizona, specifically chairman Jordan Karp - many thanks to him and the staff for supporting me. Thank you so much to the Medical University of Vienna. The course wouldn't have been possible without all your help and organization. Even more importantly, you, my students and audience, really come to these lectures. When you couldn't attend in person, you reviewed the videos, and you asked very reasonable questions that push me to extend my thinking. The whole project has benefited from that. I really look forward to working with you on our future projects. If not for your interest, it would not have been possible to present the course. I appreciate that this course was pitched at an advanced level best suited for those with extensive experience with psychotherapy, and thus it's probably quite a challenge for many of you. As you gain clinical experience, the meaning and value of the material in this course will grow. Thank you all!

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