

Appendices: Practice Handouts and Forms

The forms and handouts in this appendix are provided for you to use in your practice. They are designed to enhance the use of neurocognitive learning therapy by communicating with your patients, their families and schools about the nature of the treatment they are receiving and the role these important collateral people play in the ongoing treatment of your client.

We have found that educating important collaterals about how neurocognitive learning therapy works allows everyone in the environment to collaborate in producing an appropriate outcome. In our experience, teachers and parents often wish to know what is happening in the course of treatment. These handouts are designed to provide them with the information they need to have in order for them to be a contributing member of the treatment team for their child.

Appendix A: Teacher Orientation to Neurocognitive Learning Therapy

What Is Neurocognitive Learning Therapy?

Neurocognitive learning therapy (NCLT) is a therapeutic system designed to work with, and make use, of our understanding of how the human brain possesses and learns information. NCLT recognizes the importance of a child's experiences in the classroom and attempts to form an alliance of people important to any child, and have that alliance address issues in a consistent, reasonable, and scientifically based manner. NCLT is a developmental and holistic approach to intervention, recognizing that each person is a result of genetics, history, background, memories, etc. NCLT then represents a fusion of information processing theory, brain network models, and cognitive behavioral treatment models. It also permits the incorporation of other therapeutic techniques in a task-dependent fashion. Working with

teachers allows a child to receive the healthy messages, and practice the healthy behaviors we are trying to get them to learn, across people and across settings, in very much the same way we teach children of different ages and abilities, and help them to master the material.

What Is the Neurophysiological Basis of NCLT?

As an educational professional you understand that the learning processes used in the classroom are the same processes that your students use to learn in the world. While there may be unique subject matter to be learned in therapy, the processes you use to learn that subject are identical to those in use in the classroom. A basic premise of NCLT is that all learning occurs the same way. Whatever the subject, issue or person and emotional valence thereof, learning occurs over the same neural networks and is subject to the same laws governing working attention, processing efficiency, memory allocation, expression, and engagement. All environmental experiences provide the opportunity to learn (automatize) adaptive behavior. This is obviously not a surprise to an educational professional.

Understanding this makes it possible to develop a set of principles that would facilitate learning within the therapeutic environment that can translate into the classroom as well. These principles of learning will be quite familiar to you. The experiences we provide in therapy to facilitate learning are designed to provide the opportunity to unlearn (deautomatize) maladaptive behavioral or emotional responses to various environmental exigencies, and to learn, or relearn, more adaptive behaviors and emotional responses. How this expedited learning occurs in an environment where an individual is seeking to address issues related to mental health (therapy) is at the core of NCLT.

NCLT Is a Unique System

NCLT is not a type of therapy. It is a system of therapy. The therapeutic principles that form the core of NCLT actually underlie the functionality of every other therapeutic modality. As such, it represents the common core of all therapeutic techniques. This permits and supports the use of many other therapeutic techniques within NCLT practice. The goal of NCLT is to appropriately target the area of needed intervention. Sometimes this will be behavioral. Sometimes this will address emotion. Sometimes it means understanding a child from a genetic or life event perspective.

NCLT is as much an educational experience as it is a therapeutic model. The concepts and skills that are central to NCLT are taught to individuals.

Table A.1 Disorders whose symptomology are alleviated by memory reconsolidation

Attention deficit/hyperactivity disorder	Anxiety	Anger
Attachment disorder	Compulsive behavior	Depression
Guilt	Low arousal	Low motivation
Low self-worth	Poor motivation	Posttraumatic stress disorder
Perfectionism	Panic attacks	Phobic responses

The Basics of NCLT

1. The Principle of Memory Reconciliation

Prevailing wisdom was that learning that occurred in the presence of strong emotion became locked permanently into subcortical implicit memory circuits by special synapses never to be unlocked. It was permanently wired and would always be evoked when something happened. This meant that people had to accept that they could never change the way that they react to things, and that they just had to get used to it and adjust accordingly.

Recently, three independent groups of researchers converged on the conclusion that a wide variety of different psychotherapies can be integrated via their common ability to trigger the neurobiological mechanism of memory reconsolidation in such a way as to lead to deconsolidation of a previously learned emotional response. This is an important finding because it was amongst the first research findings that therapy can actually change the way we emotionally react to specific environmental events.

Instead, for the first time, researchers, using a specific therapeutic technique, one incorporated into NCLT, had been able to activate a learned emotional response and under certain conditions, found that its previously locked neural circuit had temporarily shifted back into an unlocked, de-consolidated, labile, destabilized, or plastic state. This unlocked state allowed prior maladaptive learning to be completely nullified, along with behavioral responses it had been driving. The temporarily labile circuit soon consolidates once again, returning to a locked condition. The researchers named this newly discovered type of neuroplasticity memory reconsolidation.

Research has identified a number of clinical conditions whose symptomology is alleviated by memory reconsolidation that occurs as part of NCLT (Table A.1).

Based on this research it is clear that the consolidation of emotional memory is not a one-time, finite process resulting in indelible emotional learning. This new knowledge forms the neuropsychological and neurophysiological basis for neuro-cognitive learning therapy. Clinically, this means that counteracting and regulating unwanted acquired responses are not the way to resolve emotional issues. Rather, relearning the adaptive response is.

NCLT is designed to teach adaptive emotional responses using well-established principles of learning, working in conjunction with specific empirically valid therapeutic techniques. As such it represents a truly integrated approach that is based on

known science as regards neuropsychology, neuroplasticity, neurophysiology, and learning.

Requirements for De-consolidation: Reactivation Plus Mismatch

In order for the memories associated with emotional reactivity to be de-consolidated, critical experience must take place when the emotional memory and related behavioral response is first reactivated. This critical experience should consist of perceptions that sharply mismatch or deviate substantially from what the reactivated target memory expects and predicts about how the world functions. This is what happens in therapy. Clinically, the mismatch can be either a full contradiction or disconfirmation of the target memory or a novel, salient variation relative to the target memory. If the target memory is reactivated by familiar cues but not concurrently mismatched, synapses do not unlock and reconsolidation is not induced. The classroom is a perfect environment for introducing perceptions that sharply mismatch the memory and associations interfering with the child's mental and academic health.

A three-step process is initially required in order to carry out the sequence eliminating the maladaptive memory and program a new adaptive memory and related behavior.

1. Symptom identification. Actively clarify with the client, or child, what to regard as the presenting symptom(s). These include the specific behaviors, somatics, emotions, and/or thoughts that the client wants to eliminate and when they happen.
2. Retrieval of target learning into explicit awareness, as a visceral emotional experience, the details of the emotional learning or schema underlying and driving the presenting symptom.
3. Identification of disconfirming knowledge. Identify a vivid experience (past or present) that can serve as living knowledge that is fundamentally incompatible with the model of reality in the target emotional learning retrieved in step 2, such that both cannot possibly be true. The disconfirming material may or may not be appealing to the client as being more "positive" or preferred. What matters is that it be mutually exclusive with the target learning. It may be already part of the client's personal knowledge, or may be created by a new experience.

There is a fourth step wherein the client verifies the new emotional response by generalizing it into new situations and contexts.

2. Reward Recognition

Estimates vary, but it has been suggested that human adults make 35,000 remotely conscious decisions each day. Assuming 16 waking hours each day that's almost 2200 decisions every hour, 36 decisions every minute, and 1 decision about every second and a half. Young children make as few as 3000 decisions in a day. Decisions represent choices between two or more options. That's what your student is doing when they choose between doing their homework and playing their favorite video game. They are making a choice between two options. These decisions are not

isolated instances. Each one builds upon the other. These compounded choices not only build upon each other, they act interdependently with other contextually relevant decisions resulting in a complex web of interconnected patterns of actions and emotional responses.

Some decisions are practiced so much that they become automatic; we do them without having to think about them. After some practice we no longer think about them individually, they automatically occur in a sequence.

NCLT teaches that when a person is confronted by making a choice between two or more stimuli, a separate sampling process for each attribute of each of the available choices is conducted. When we are thinking about deciding between choices, our attention switches from one attribute consideration to the next. The order in which attributes are considered, as well for how long each attribute is considered (attention time), influences the predicted choice probabilities and choice response times. Both order of attribute consideration and attention time given to each attribute are important targets for discussion within an NCLT session.

Perceived rewards are a critical part of the consideration of choice attributes. For NCLT, understanding the value of rewarding and punishing stimuli from your child's perspective will enable an understanding of when and where such rewards and punishments will be identified and used. Helping your student identify potentially rewarding aspects of the desirable choice you wish them to make is an important part of the work in NCLT.

The Role of the Educator

Educators can be valuable in this process because they can help identify many of the targets to practice as well as many of the disconfirming events. They can identify maladaptive responses (emotional or behavioral) that are causing the individual student difficulty. Then, working in conjunction with the NCLT therapist, they can help by recognizing situations in the classroom that call for the adaptive response and cuing the student to engage in it. Teaching professionals can also point out the inconsistencies between the student's original perception and the realities in the classroom. Many times in therapy, situations that produce maladaptive responses can only be discussed because the situations arise in the student's everyday life outside of the therapy environment. Teachers are uniquely qualified to both identify these events and support the elimination of maladaptive responses and the relearning of adaptive ones by cuing those adaptive responses to occur. An NCLT therapist will actively work with professional educational staff to both obtain the targets for modification and plan for a teacher response that will facilitate new learning.

What Happens in Therapy?

NCLT Is About Learning

From an NCLT perspective a therapist assumes an active, instructive, and authoritative role and teaches patients to think and conduct themselves differently. This is initially a collaboration between the therapist and the client with the therapist teaching concepts and skills. After the initial learning is in place, the process is expanded to family members and for children, teachers, and other school personnel. This is because NCLT encourages clients to practice new ways of thinking and behavior in everyday life. NCLT is focused on providing the client the tools to understand and operationalize their thoughts, feelings, and emotions.

The ultimate goal is for the client to take over monitoring and modifying the behaviors and thoughts that contribute to their mental health. For young children, this will inevitably mean that the parents are trained in the process so that they may continue to cue their children until the child develops the cognitive sophistication to take over the process.

The Process of Therapy

Therapy is a process of taking previously maladaptive automatic behaviors and thoughts, de-automatizing them and creating new adaptive automatic behaviors and thoughts (responses) to life's various situations. Therapy in this perspective is about the therapist imparting information and having the person use that information to change behavior and emotional response sets. Attaining ultimate success in terms of self-fulfillment or realizing one's potential would be in effect a decision that an individual made when they were no longer engaging in identifiably maladaptive behavior. The practicing therapists and client's job is to select learning opportunities and design activities that will make learning and automatizing adaptive behaviors and thoughts more efficient. Significant others in the person's life are critical in identifying these learning situations. For children this often includes both parents and teachers.

NCLT Is a Model Based on Teaching

All therapy represents a form of learning. There are ways to make learning the material associated with therapeutic change efficient, and there are ways to do it inefficiently. As in other forms of learning, NCLT strives to produce learners who understand how they learn and can use that understanding to continually enhance and develop their knowledge and effectiveness. We teach strategies based upon learning principles.

NCLT Respects What Is Known About the Conduct of a Therapist

The principles that embody NCLT practice are not meant to supplant what is known about the value of the therapeutic relationship. NCLT therapists acknowledge that while the creation of a supportive therapeutic relationship is an important attribute of any therapeutic interaction it, by itself, is not sufficient to insure the effectiveness of the relationship between a therapist and a client. NCLT therapists recognize that liking each other is not the goal of therapy. In fact, while a relationship might be

positive, as evidenced by the client's positive regard of the therapist and vice versa, there exists the possibility that, within such a context, the client may in fact not be learning or understanding anything.

Effectiveness is defined in NCLT practice as making measureable progress towards the specific outcomes that were developed at the beginning of treatment. What is most important is that the therapist must understand where in the development of ideas and concepts the client is, so that information can be presented that is accessible and useable by the client. For this to occur, the therapist must understand how certain constructs are developed, and then be able to guide the client on a predictable path to the healthy development of those constructs.

The Core Principles of NCLT

The best way to understand NCLT is to understand its core principles. NCLT really has three sets of principles that govern its operation. By understanding these principles you will have a good deal of insight into what is happening in treatment for your student.

The therapist must focus on the client and how they will incorporate and utilize new knowledge.

It is important to understand that, for a variety of reasons, all information is not useable all the time. There are preconditions that must be met before new information is accessible and usable by the client. Some of these preconditions are as follows:

New Information Must Be at Odds with Existing Information

The process of cognitive and related emotional change is initiated when an individual realizes a new idea does not align with his current thinking or prior knowledge. NCLT posits that for therapy to be successful it is necessary for this moment of conflict to be purposeful, explicit, and clearly expected by the client to occur as part of therapy. In NCLT therapy the client understands that the purposeful challenges to the status quo emotionally and behaviorally will be made. For that to occur, the client must first be cognizant and able to identify the components of a current schema surrounding the construct and recognize that the new idea or fact is discordant with the information already held. NCLT recognizes that when this moment of conflict occurs, an individual will seek out answers in order to align their thinking and resolve the conflict.

New Information Can't Be Too Challenging or It Will Be Rejected

A goal in NCLT treatment is to cause changes in the target concept that to lead to a new understanding and expansion of the concept. Information that is too discordant with the existing information or represents very significant differences between what is known and what is new will represent too difficult a challenge for an individual will be rejected.

New Information Must Be Compared with Existing Information

NCLT recognizes that it is critically important that both the therapist and the client examine the new information in relation to what is known, and discuss how it might be used to impact the target behavior. This is an active and ongoing discussion between therapist and client as they work together to discuss the effect of the new behavior or belief. NCLT therapists understand that most clients, while stating that they desire improvement, really like and wish to hold on to their existing behaviors and beliefs. This is because they have worked hard to learn them and they have become, in many instances, automatic. Leaving the resolution of conflict solely for the client to address increases the probability that the new information may be rejected. In addition, if it does get included, the way that it gets included may be neither what the therapist intended nor desirable. The therapist should of course be aware that in some instances, where beliefs are rigidly held, it is easier for an individual to reject the new information to preserve the core belief.

New Information Is Appended onto Existing Information

New information is not learned snippet by snippet and retained in isolation. Rather, new information is appended onto existing information. This implies that you cannot just add an adaptive response or thought onto what is an already existing body of maladaptive behaviors and thoughts. NCLT recognizes that entire clusters of thoughts related to certain topics and actions will have to be critically challenged and altered.

There is no knowledge independent of the meaning attributed to it by prior experience. Knowledge is constructed by the client.

No information is processed by an individual independently of what that individual already knows. New information is always appended to existing memory in order to be remembered. If the therapist is going to provide information designed to alter a maladaptive belief or set of beliefs (depression), it is necessary to identify for both the therapist and the client how that existing set of beliefs operate and how they distort new information to conform to existing thought patterns.

The examination of how the existing schema encodes information should be the primary task of the intervention, and should occur before the actual attempts at altering are made. Without this information it is possible, and in some instances likely, that those maladaptive beliefs and behaviors will actually be reinforced by the therapeutic intervention.

In therapy it is the client who decides which sensory input is important, to construct meaning out of and commit to memory.

Clients in therapy do not consider everything said during the course of therapy as important or worthy of retention in memory. Listeners actively choose which information to attend to and remember. Changing what clients attend to is more important than what clients actually practice telling themselves. This process of selected attention to specific material, and the ignoring of other material, is termed gating.

Clients, not therapists, ultimately get to determine what is important and what is not, and it is highly possible that clients may select things to attend to that are extraneous to the process of treatment. NCLT therapists understand this process and

engage actively with their clients to help them focus on critical areas of the materials to be learned.

The construction of meaning in therapy is a purposeful activity.

Clients construct systematically more advanced and complex adaptive schema (bodies of knowledge). It is the construction of the schema that determines how new knowledge is both interpreted and potentially incorporated. Once learned, clients subconsciously rehearse and refine these new schemas and related strategies to move them towards automaticity.

Automaticity

At the beginning of therapy a client will present with a number of problem behaviors and/or ideas which are causing them difficulty. These behaviors and ideas are the result of a complex and extensive learning history that, through the continuing interaction between existing schema and new information in the environment, produced the current automatic default condition.

Learning in therapy consists both of constructing new meaning and new systems of interrelated meaning. The goal of this learning is to develop a system of adaptive behavior and thought. In most instances this new system of adaptive behavior and thought will be at odds with the existing and entrenched system of maladaptive behavior and thought. In order to make therapeutic progress, the new system of adaptive behavior and thought must be reinforced and encouraged to the point of automaticity, while the existing maladaptive schema must be made nonautomatic. This is a two pronged process. The new adaptive system must be purposefully selected and practiced in many environments while at the same time the old maladaptive system must be purposefully deselected and not practiced in those same environments.

All of this requires precision in definition and in identifying therapeutic behavioral and emotional outcomes. It also requires that the client to understand and participate in the process of constructing new and adaptive schema.

New Behaviors Are Clumsy

Treatment will initially produce a new response schema that is poorly developed, skeletal, poorly generalized, and poorly interconnected. This means that the client will likely not spontaneously use the new information outside of the therapeutic environment. This new schema must be purposefully developed and practiced to the point of automaticity. The client must be an active participant in this process. The process is best accomplished with clearly defined learning outcomes and specific teaching strategies designed to reach those outcomes. Individuals learn better and develop efficient subconscious rehearsal strategies when goals are clearly articulated.

Humans learn by pattern matching. Each meaning we construct makes us better able to give meaning to other stimuli which can match with a previously identified and categorized, similar pattern.

When we encounter a new stimulus, the brain immediately begins to attempt to match it with what is already known. Humans pattern match between crucial issues in the environment and elements of mental schemata to determine which schemata will be accessed and used to append the new information. Classes of stimuli are grouped together in the brain. Clients seeking treatment often have whole classes of stimuli (schemata) that they react poorly to.

On occasion, increasing exposure and information can amend a schema or split it into two related schemata. Suppose, for example, you were afraid of all spiders and reacted with a great deal of anxiety to an appearance of any spider. Now suppose you were motivated by your new job at the arachnoid exhibit at the zoo and took the time to learn about spiders and found out which ones were dangerous and which were not. Eventually you would develop two highly related schemata, spiders which were dangerous and spiders which were not. The response patterns to these schemata would be different. NCLT therapy works in a similar fashion. The goal of treatment is to make the response patterns of individual's to specific schema explicit so that they can be examined and modified. Maladaptive responses should be deconditioned, and adaptive responses practiced and automatized.

The construction of meaning is neurophysiologically based and involves brain circuitry dedicated to pattern matching, learning, and reinforcement recognition.

All information that is learned is processed over the same neural networks. There is no separate system for material learned in therapy, although there may be, as a result of the emotional valence of the material, different brain regions recruited for specific elements of what is discussed in treatment.

Specific recruitment of brain regions is not unique to learning in a therapeutic context, it is a characteristic of all learning. Regions responsible for emotional valence and reward recognition are not the exclusive domain of the material learned in therapy. These regions are recruited by any activity which is accompanied by a level of arousal. The regions which are responsible for reward recognition are critical in the gating process. Gating is the process that determines what information is accepted into working memory, and therefore determines what material is available to be worked on in therapy.

Therapists knowingly or unknowingly provide encouragement, direction, and support.

Clearly the degree to which the relationship between the therapist and the client produces an environment for encouragement and support is a factor in determining the effect of therapy. It is clear that the therapists' approval and support is as source of reinforcement that is used by all therapists to guide and shape the course of learning.

The language we use influences learning. Language and learning are inextricably intertwined.

Language is a critical tool for the shaping and reshaping of thought and related emotional states. The directed, purposeful, and structured use of language is important for imparting information designed to change cognition. Obviously, the

haphazard or inefficient use of this tool would produce less than optimal results. Therefore, those systems that make purposeful use of language are to be preferred to less directed systems where the expected impact of language is not planned, or in fact the use of language itself, is minimized.

Learning in therapy is a social activity. To be useful, knowledge acquired in therapy must be applied and practiced within the context of both new and existing relationships.

There are two separate points here, the first of which is that learning is a social process with at least two active participants, and the second is that new learning must be practiced in those social contexts in which it was intended. This practice must be purposeful and directed. New behavior must be practiced in the social world for it to be incorporated into the automatic repertoire of the learner. Such practice represents the core of a planned and purposeful therapy process. The learning outcome for the practice should be known to the learner so that the result of the practice can be integrated into the appropriate body of existing knowledge. The goal is automaticity of new behavior into the repertoire of the individual.

Learning in therapy is contextual. We learn in relationship to what else we already know, and what we already believe.

Just as in building academic skill sets, a sound foundation is necessary. In therapy it is not desirable to append adaptive knowledge to maladaptive preexisting knowledge. To be effective, new skill sets and their associated cognitions must be developed and practiced. In practice, this is difficult to do because humans show a strong tendency to hold onto prior knowledge and discount new knowledge that is not in agreement with prior knowledge. In other words, if the new knowledge disagrees with what I already believe, I have a strong tendency to reject the new knowledge to protect my existing beliefs. Indeed, it can be argued that one purpose of knowledge is to develop attitudes and belief systems that are resistant to change, and that this rejection of new beliefs or knowledge serves a valuable protective function.

In order to understand how this process works, it is important to know that as we have discussed, humans learn by pattern matching. When we first encounter a novel stimulus we search what we know, looking for similar patterns or constructs to relate it to. We then look at this information in light of what we already know. We can do one of three basic things with this new knowledge. We can accept it and alter what we already know. We can reject it and protect what we already know. Or we can consider it, and see how it fits in with what we already know.

As we have seen, humans have a propensity to protect what we already know and therefore, the most likely scenario when confronted with new information is to reject it outright. The second most likely event is to consider it, and see how it fits in with what we already know, and the least likely outcome is to accept the discordant new information and throw away, or irrevocably alter what we already know. Much of what the lay person thinks about when they think about therapy is defined by this last most unlikely outcome. People believe that the therapist will say something, and on the basis of that statement, a transformation of the maladaptive body

of knowledge will occur. As we have just learned, this is both unlikely and counter to the actual tendency of people when they encounter new information.

What is more likely, and in fact therapeutically desirable, is that the client (learner) engages in the middle option. They will use the new information to see how it relates to what they already know. You may know this as critical thinking. We do know a few things about how this occurs. One of the most important things is that for this objective analysis to occur, the learner must be motivated to do the comparison, and dispassionate about the analysis. The stronger the attitude is held, the more difficult the comparison is to make. In addition, beliefs associated with strong affect states lead to strongly held attitudes which are more resistant to change.

All of this goes to the point that in order to change the strongly held, emotionally laden belief systems that characterize the thinking of people with emotional problems, the clients must be encouraged to do a systematic and dispassionate analysis of those belief systems in an environment or in a manner that does not threaten the client and cause the client to withdraw. New information must be presented that is just different enough and minimally threatening enough to enable the client to process it, while at the same time be both novel and interesting enough to encourage the allocation of working memory to the process. This calls for a careful and thoughtful assessment of the type of new information, its purpose, and how it will be offered to the client. This argues persuasively that clients should not be left to their own devices to filter the information provided in a therapeutic exchange because their natural tendency will be to reject new information or avoid comparison or questioning their passionately held attitudes. The job of the therapist is, with the learning outcome clearly in mind, to systematically prepare the stimuli so that they meet the just right challenge and create an environment wherein the client is open to and engaged in confronting maladaptive attitudes and beliefs. By a process of shaping and desensitization, the therapist should present new information designed to challenge the existing attitude while at the same time not being threatening to it.

It is not possible to assimilate new knowledge without having some structure developed from previous knowledge upon which to build.

Learning is incremental. The more we know, the more we can learn. Therefore, any effort to teach must be connected to the state of the client, and must provide a clear, direct, and unambiguous path into the subject for the learner that emanates from the learner's (client's) previous knowledge. This implies that adaptive beliefs and constructs should form the basis of new learning, and that therapy should be directed towards both creating the functional beliefs, attitudes, and skill sets and then practicing those skill sets in multiple environments.

Learning occurs when some responses are trained and selected, and others are not trained and are deselected. Learning is effective when this process is directed and specific, with the learning paths specified and reinforced. Learning is then enhanced through a process of refinement of, and automatization of, these selected responses.

Learning new ideas and ways of behaving in therapy is not instantaneous.

Learning requires both practice and rewards. Clients must recognize old ideas as maladaptive, and actively seek to replace them with new ideas based upon a foundation of new learning and successful application. Research has suggested that learn-

ing new skills or changing existing cognitive schema is enhanced, in terms of increased automaticity, when new concepts are pulled into working memory and then used in multiple applications. In order to create these various applications, guided practice enhanced with behavioral practice improves learning efficiency. To effect learning and generalization of new constructs in therapy, highly structured and guided instruction is necessary to create the new schema. Only after the new schema is constructed it is beneficial to reduce guidance and structure.

Motivation is a key component in learning. Not only is it the case that motivation helps learning, it is essential for learning.

For NCLT, motivation is not the product of a mystical personality trait that certain individuals either have in abundance or in which they are deficit. For NCLT, motivation reflects the operation of the reward recognition circuit which is either more or less efficiently integrated with behavioral circuits. Success is reinforcing and results in the increased likelihood the action will continue to be selected in the future. Therapeutic progress therefore is facilitated when a planned program of increasingly complex actions is engaged in and reinforced. Motivation is therefore derived from successful practice and automatization of target behaviors designed to achieve a specific goal.

Maladaptive behavior and thought is based upon automaticity.

Automaticity is the goal of human learning. In this regard maladaptive thought and resulting behavior is no different than any other type of thought including adaptive thought. It is learned in the same way, expressed behaviorally in the same way, and automatized in the same way. The neural circuitry involved in its learning is the same neural circuitry that is involved in all other learning, including math and reading. From this we can conclude that the neural circuitry over which the maladaptive learning took place is functioning entirely appropriately. It is only that the learned connections lead to less than adaptive behavior and thought. Therefore, brains are not defectively permanently wired, or permanently damaged. It is not guaranteed that a person with an emotional dysregulation issue has a badly wired brain. In many instances the diagnosis merely implies that the current patterns of connectivity are the result of reinforcement patterns that have not produced adaptive behavior. NCLT posits that, in most instances, this is not a permanent condition. These pathways supporting maladaptive behavior can be altered by the same processes that supported their formation in the first place.

The ability to solve problems and the ability to adapt to novel situations are positively correlated with improved mental health.

Learning occurs when potential responses to environmental occurrences are reweighted with some responses being made more likely and other responses becoming less likely.

Both working memory and processing speed efficiency play important roles in this process. Deselection and reselection depends on the ability to suppress (deselect) newly identified task-irrelevant information as well as the ability to activate (select) newly identified task-relevant information. Efficient working memory results in material being held in working memory for a greater period of time and

being increasingly available for modification. This leads to the potential for increased flexibility which in turn implies increased ability to evaluate novel solutions and consider new responses. It also suggests increased ability to select a new response to make automatic.

Therapy is cognitively demanding.

Deselection and reselection of a new process to make automatic (the process of therapy) is at first a conscious, planned, and time-consuming process. An individual who is attempting to eliminate a maladaptive, automatized process such as a complex maladaptive behavioral response or thought will struggle due to the required cognitive effort. It is likely that they will become even more inefficient and ineffective as they shift from their maladaptive strategies to newer, potentially effective but not yet automatic cognitive processes. Support here becomes critical.

Learning is about connections in that what is stored together stays together in memory.

Learning new things in therapy, as in all other learning, occurs in context. What is learned is associated and remembered in the context of what was around it during the time it was encountered. Therefore, it is critical to the process of therapy that newly learned adaptive responses should be practiced in as many new contexts as is possible. This practice should be a planned and purposeful part of treatment and not just be left to circumstance.

The basic principles of learning for NCLT are:

1. Learning is a product of working memory allocation
2. Working memory's capacity for allocation is affected by prior knowledge
3. Working memory allocation is directed by motivation

NCLT offers the following as rules that govern the process of knowledge acquisition in therapy.

If knowledge in long-term memory is retrieved, the strength of association between all items retrieved to working memory is increased. Clinically this implies that how things are presented and grouped in working memory determines what procedures will be developed from their association.

If a knowledge is retrieved, all other elements of knowledge to which it is connected are retrieved, and all connections are strengthened.

If parts of retrieved knowledge match to working memory contents, the connection between the existing knowledge and the new material are strengthened. If parts of retrieved knowledge do not match to contents in working memory, the connections are weakened and inhibited. Establishing new pattern matches (schemata) is an essential component in therapy.

If an action is successful, its connection to the knowledge of the situation in which it occurred is strengthened. If an action is unsuccessful, its connection to the knowledge of the situation in which it occurred is weakened or inhibited. The therapeutic implication of this is that new procedures must be understood and conscientiously practiced.

If knowledge has been retrieved, new information in working memory will be connected to this knowledge. This is the basis of establishing new adaptive procedures.

Any active knowledge in long-term memory is accessible to working memory.

The Goal of Therapy Is Also Competence

The term competence has been used to refer to accumulated learning experiences that result in a pattern of effective adaptation within an environment. Within the NCLT clinical context, it implies that the individual has (or lacking competence does not have) the capability to perform well in the future. Like many cognitive therapy models NCLT posits that an individual who lacks competence in an environment becomes self-aware and engages in negative self-appraisals. These negative self-appraisals are reinforced and reproduced regularly until they are automatically associated with a class of behaviors or physiological responses. NCLT theory hypothesizes that these automatically associated physiological responses and appraisals are experienced as affect states such as depression and anxiety. That is, in part, because the physiological responses associated with these affect states are also associated through the same principles of learning, to the cognitions associated with the appraisals.

Summary

The astute educator will probably recognize that many of the above principles are identical to those that govern knowledge acquisition in the classroom and that is, of course, exactly the point. All therapy is about learning. For children, educators have an important role in this process, and must be intensively involved in the identification and creation of new and adaptive learning targets.

Appendix B: Parent Orientation to Neurocognitive Learning Therapy

You and your child are about to start a planned learning experience designed to teach your child new and more adaptive ways to handle the stressors and behavioral difficulties that have proved challenging in the past. Although the primary target of this treatment is your child, it is important to know that the entire family will have to participate for the treatment is to be successful. You are vitally important in this process. This guide is designed to provide you with important information about what is going to be occurring in treatment. In addition, it will provide information designed to help you to know how to support your child's treatment at home.

Please make sure you work with your child's therapist to establish the goals and objectives for treatment, and identify the learning situations that happen at home that provide opportunities for your child to practice their new behavior. If you have questions after you have finished reviewing this guide, please make sure you schedule time to get the answers you need.

What Is Neurocognitive Learning Therapy?

Neurocognitive learning therapy (NCLT) is a therapeutic system designed to work with and make use of our understanding of how the human brain processes and learns information. For NCLT, therapy is considered a process of increasing the likelihood of the expression of adaptive behaviors, healthy emotional responding and thought processes, and weakening or unlearning maladaptive ones. For NCLT, the therapy process goal is to eliminate maladaptive behaviors and thoughts which have become automatic, and develop new, adaptive behaviors and thoughts which will become automatic. NCLT represents a fusion of information processing theory, brain network models and cognitive behavioral treatment models, within a developmental perspective. It comes from the perspective of mental health, teaching new ways to have healthier thoughts, feelings, and behavioral expressions. It has a strong respect for the developmental level of the person we work with, and where in the life course they currently are.

What Is the Neurophysiological Basis of NCLT?

A basic premise of NCLT is that all learning begins at birth. Learning both affects, and is affected by, the developing brain and the interaction with the environment. Whatever the subject, issue or person and emotional valence thereof, learning occurs over the same neural networks, and is subject to the same laws governing working memory allocation, attention, processing efficiency, memory, expression, and engagement. The goal of therapy is to learn healthy, adaptive behaviors, emotions, and patterns. Therapy for younger children also includes the benefit of preventing the patterning or learning of maladaptive patterns.

All environmental experiences provide the opportunity to learn adaptive behavior. Sometimes, however, we don't. Understanding this makes it possible to develop a set of principles that would facilitate learning within the therapeutic environment. The experiences we provide in therapy to facilitate learning are designed to provide the opportunity to unlearn maladaptive behavioral or emotional responses to various environmental exigencies, and learn more adaptive behaviors and emotional responses. How this expedited learning occurs in an environment where an individual is seeking to address issues related to mental health (therapy) is at the core of NCLT.

NCLT Is a Unique System

NCLT is not a type of therapy. It is a system of therapy. NCLT does not fall neatly into any of the existing therapeutic disciplines that you might be familiar with. The therapeutic principles that form the core of NCLT actually underlie the functionality of every other therapeutic modality. As such, it represents the common core of all therapeutic techniques. This permits and supports the use of many other therapeutic techniques within NCLT practice. Rather than a therapeutic model with a single focus, NCLT is more of a broad educational experience; The concepts, principles, and skills that are central to NCLT are taught to individuals. The client, irrespective of their age, becomes an active participant.

The Basics of NCLT

The Principle of Memory Reconciliation

Recently, three independent groups of researchers using specific therapeutic techniques utilized in NCLT have demonstrated the ability to activate a learned emotional response, and under certain conditions found that its previously locked neural circuit had temporarily shifted back into an unlocked, de-consolidated, labile, destabilized, or plastic state. This unlocked state allowed prior maladaptive learning to be completely unlearned, along with behavioral responses it had been driving. The temporarily labile circuit soon consolidates once again, returning to a locked condition. The researchers named this newly discovered type of neuroplasticity “memory reconsolidation.”

Prior to this research, the prevailing wisdom was that learning that had occurred in the presence of a strong emotion became locked permanently into subcortical implicit memory circuits by special synapses, never to be unlocked. They were permanently wired and would always be evoked when some trigger occurred. This implied that people had to accept that they could never change the way that they react to things, that they just had to get used to it, and adjust accordingly. Fortunately, this wisdom was wrong.

Research has identified a number of clinical conditions whose symptomology is alleviated by memory reconsolidation that occurs as part of NCLT (Table A.1).

This new knowledge forms the neuropsychological and neurophysiological basis for NCLT. Clinically, this means that while physiological responses may be hard

Table A.1 Disorders whose symptomology are alleviated by memory reconsolidation

Attention deficit/hyperactivity disorder	Anxiety	Anger
Attachment disorder	Compulsive behavior	Depression
Guilt	Low arousal	Low motivation
Low self-worth	Poor motivation	Posttraumatic stress disorder
Perfectionism	Panic attacks	Phobic responses

wired, counteracting and regulating unwanted acquired responses are not the way to resolve emotional issues. Rather, relearning or learning the adaptive response is.

NCLT is designed to (re)teach adaptive emotional responses using well-established principles of learning, working in conjunction with specific empirically valid therapeutic techniques.

Memory Reconsolidation in Therapy

In order for the memories that trigger the maladaptive emotional response to be unlearned, a critical experience must take place in therapy. In order to accomplish this, the emotional memory and related maladaptive behavioral response is first reactivated. This critical experience should provide perceptions that sharply mismatch or deviate substantially from what the reactivated target memory expects, and predicts about how the world functions. This is what happens in therapy. Clinically, the mismatch can be either a full contradiction or disconfirmation of the target memory or a novel, salient variation relative to the target memory. If the target memory is reactivated by familiar cues, but not concurrently mismatched, synapses do not unlock and reconsolidation is not induced.

A three-step process is initially required in order to carry out the sequence eliminating the maladaptive memory and program a new adaptive memory and related behavior.

- Symptom identification. Actively clarify with the client what to regard as the presenting symptom(s). These include the specific behaviors, somatics, emotions, and/or thoughts that the client wants to eliminate and when they happen.
- Retrieval of target learning into explicit awareness, as a visceral emotional experience, the details of the emotional learning underlying and driving the presenting symptom.
- Identification of disconfirming knowledge. Identify a vivid experience (past or present) that can serve as living knowledge that is fundamentally incompatible with the model of reality in the target emotional learning retrieved in the prior step, such that both cannot possibly be true. The disconfirming material may or may not be appealing to the client as being more “positive” or preferred; what matters is that it be mutually exclusive with the target learning. It may be already part of the client’s personal knowledge or may be created by a new experience.

There is a fourth step wherein the client verifies the new emotional response by generalizing it into new situations and contexts.

Reward Recognition

Estimates vary but it has been suggested that human adults make 35,000 remotely conscious decisions each day. Assuming 16 waking hours each day that’s almost 2200 decisions every hour, 36 decisions every minute, and 1 decision about every second and a half. Young children make as few as 3000 decisions in a day. Decisions represent choices between two or more options. That’s what your child is doing

when they choose between doing their homework and playing their favorite video game. They are making a choice between two options. These decisions are not isolated instances. Each one builds upon the other. These compounded choices not only build upon each other, they act interdependently with other contextually relevant decisions resulting in a complex web of interconnected patterns of actions and emotional responses.

Some decisions are practiced so much that they become automatic; we do them without having to think about them. After some practice we no longer think about them individually, they automatically occur in a sequence.

NCLT teaches that when a person is confronted by making a choice between two or more stimuli a separate sampling process for each attribute of each of the available choices is conducted. When we are thinking about deciding between choices our attention switches from one attribute consideration to the next. The order in which attributes are considered as well for how long each attribute is considered (attention time) influences the predicted choice probabilities and choice response times. Both order of attribute consideration and attention time given to each attribute are important targets for discussion within an NCLT session.

Perceived rewards are critical part of the consideration of choice attributes. For NCLT, understanding the value of rewarding and punishing stimuli from your child's perspective will enable an understanding of when and where such rewards and punishments will be identified and used. Helping your child identify potentially rewarding aspects of the desirable choice you wish them to make is an important part of the work in NCLT.

The Role of the Parent

Parents can be valuable in this process because they can help identify many of the targets to practice as well as many of the disconfirming events. They can identify maladaptive responses (emotional or behavioral) that are causing their child difficulty. Then working in conjunction with the NCLT therapist, they can help by recognizing situations at home that call for the newly taught adaptive response and cuing the child to engage in it. Parents can also point out the inconsistencies between the original perception and the realities at home. Many times in therapy situations that produce maladaptive responses can only be discussed because the situations arise in the child's everyday life outside of the therapy environment. Parents are uniquely qualified to both identify these events and to support the elimination of maladaptive responses and the relearning of adaptive ones by cuing those adaptive responses to occur.

What Happens in Therapy?

NCLT Is About Learning

From an NCLT perspective, a therapist assumes an active, instructive, and authoritative role, and teaches patients to think and conduct themselves differently. This is

initially a collaboration between the therapist and the client with the therapist teaching concepts and skills. After the initial learning is in place, the process is expanded to family members and, for children, teachers, and other school personnel. This is because NCLT encourages clients to practice new ways of thinking and behaviors in everyday life. NCLT is focused on providing the client the tools to understand and operationalize their thoughts, feelings, and emotions.

The ultimate goal is for the client to take over monitoring and modifying the behaviors and thoughts that contribute to their mental health. For young children, this will inevitably mean that the parents are trained in the process so that they may continue to cue their children until the child develops the cognitive sophistication to take over the process themselves.

The Process of Therapy

Therapy is a process of taking previously maladaptive, automatic behaviors and thoughts, de-automatizing them and creating new adaptive automatic behaviors and thoughts (responses) to life's various situations. Therapy in this perspective is about the therapist imparting information and having the person use that information to change behavior and emotional response sets. Attaining ultimate success in terms of self-fulfillment or realizing one's potential would be in effect a decision that an individual made when they were no longer engaging in identifiably maladaptive behavior. The practicing therapists and clients job is to select learning opportunities and design activities that will make learning and automatizing adaptive behaviors and thoughts more efficient. Significant others in the person's life are critical in identifying these learning situations. For children, this often includes both parents and teachers.

NCLT Is a Model Based on Teaching

All therapy represents a form of learning. As in other forms of learning, NCLT strives to produce learners who understand how they learn so that they can use that understanding to continually enhance and develop their knowledge and effectiveness. We teach strategies based upon learning principles with the intent of our clients being able to take that information and continue to correctly apply it on their own.

NCLT Respects What Is Known About the Conduct of a Therapist

NCLT therapists acknowledge that while the creation of a supportive therapeutic relationship is an important attribute of any therapeutic interaction it, by itself, is not sufficient to insure the effectiveness of the relationship between a therapist and a client. NCLT therapists recognize that liking each other is not the goal of therapy. In fact, while a relationship might be positive, as evidenced by the clients positive regard of the therapist and vice versa, there exists the possibility that, within such a context, the client may in fact not be learning or understanding anything.

Effectiveness is defined in NCLT practice as making measureable progress towards the specific outcomes that were developed at the beginning of treatment. What is most important is that the therapist must understand where in the development of ideas and concepts your child is so that information can be presented that is accessible, and useable. For this to occur, the therapist must understand how certain constructs are developed, and then be able to guide the client on a predictable path to the healthy development of those constructs.

The Core Principles of NCLT

The best way to understand NCLT is to understand its core principles. NCLT really has three sets of principles that govern its operation. By understanding these principles you will have a good deal of insight into what is happening in treatment for your child.

The therapist must focus on the client and how they will incorporate and utilize new knowledge.

It is important to understand that, for a variety of reasons, all information is not useable all the time. There are preconditions that must be met before new information is accessible and usable by the client. Some of these preconditions are as follows:

New Information Must Be at Odds with Existing Information

The process of cognitive and related emotional change is initiated when an individual realizes a new idea does not align with his current thinking or prior knowledge. NCLT posits that for therapy to be successful, it is necessary for this moment of conflict to be purposeful, explicit, and clearly expected by the client to occur as part of therapy. In NCLT therapy, the client understands that the purposeful challenges to the status quo emotionally and behaviorally will be made. For that to occur the client must first be cognizant and able to identify the components of a current schema surrounding the construct and recognize that the new idea or fact is discordant with the information already held. NCLT recognizes that when this moment of conflict occurs, an individual will seek out answers in order to align their thinking and resolve the conflict.

New Information Can't Be Too Challenging or It Will Be Rejected

A goal in NCLT treatment is to cause changes in the target concept that to lead to a new understanding and expansion of the concept. Information that is too discordant with the existing information or represents very significant differences between what is known and what is new will represent too difficult a challenge for an individual will be rejected.

New Information Must Be Compared with Existing Information

NCLT recognizes that it is critically important that both the therapist and the client examine the new information in relation to what is known, and discuss how it might be used to impact the target behavior. This is an active and ongoing discussion between therapist and client as they work together to discuss the effect of the new behavior or belief. NCLT therapists understand that most clients, while stating that they desire improvement, really like and wish to hold on to their existing behaviors and beliefs. This is because they have worked hard to learn them and they are in many instances automatic. Leaving the resolution of conflict solely for the client to do increases the probability that the new information may be rejected. In addition, if it does get included the way that it gets included may be neither what the therapist intended nor desirable. The therapist should of course be aware that in some instances, where beliefs are rigidly held, it is easier for an individual to reject the new information to preserve the core belief.

New Information Is Appended onto Existing Information

New information is not learned snippet by snippet and retained in isolation. New information is appended onto existing information. This implies that you cannot just add an adaptive response or thought onto what is an already existing body of maladaptive behaviors and thoughts. NCLT recognizes that entire clusters of thoughts related to certain topic and actions will have to be critically challenged and altered.

There is no knowledge independent of the meaning attributed to it by prior experience. Knowledge is constructed by the client.

No information is processed by an individual independently of what that individual already knows. New information is always appended to existing memory in order to be remembered. If the therapist is going to provide information designed to alter a maladaptive belief or set of beliefs (depression), it is necessary to identify for both the therapist and the client how that existing set of beliefs operate and how they distort new information to conform to existing thought patterns.

The examination of how the existing schema encodes information should be the primary task of the intervention and should occur before the actual attempts at altering are made. Without this information it is possible, and in some instances likely, that those maladaptive beliefs and behaviors will actually be reinforced by the therapeutic intervention.

In therapy it is the child who decides which sensory input is important, to construct meaning out of and commit to memory.

Children in therapy do not consider everything said during the course of therapy as important or worthy of retention in memory. Listeners actively choose which information to attend to and remember. Changing what clients attend to is more important than what clients actually practice telling themselves. This process of selected attention to specific material, and the ignoring of other material, is termed gating.

Children, not therapists, ultimately get to determine what is important and what is not, and it is highly possible that they may select things to attend to that are extraneous to the process of treatment. NCLT therapists understand this process and engage actively with their clients to help them focus on critical areas of the materials to be learned.

The construction of meaning in therapy is a purposeful activity.

Clients construct systematically more advanced and complex adaptive schema (bodies of knowledge). It is the construction of the schema that determines how new knowledge is both interpreted and potentially incorporated. Once learned, clients subconsciously rehearse and refine these new schemas and related strategies to move them towards automaticity.

Automaticity

At the beginning of therapy a client will present with a number of problem behaviors and/or ideas which are causing them difficulty. These behaviors and ideas are the result of a complex and extensive learning history that, through the continuing

interaction between existing schema and new information in the environment, produced the current automatic default condition.

Learning in therapy consists both of constructing new meaning and new systems of interrelated meaning. The goal of this learning is to develop a system of adaptive behavior and thought. In most instances this new system of adaptive behavior and thought will be at odds with the existing and entrenched system of maladaptive behavior and thought. In order to make therapeutic progress the new system of adaptive behavior and thought must be reinforced and encouraged to the point of automaticity while the existing maladaptive schema must be made nonautomatic. This is a two pronged process. The new adaptive system must be purposefully selected and practiced in many environments while at the same time the old maladaptive system must be purposefully deselected and not practiced in those same environments.

New Behaviors Are Unstable

Treatment will, initially, produce a new response schema that is poorly developed, skeletal, poorly generalized, and poorly interconnected. This means that the client will likely not spontaneously use the new information outside of the therapeutic environment. This new schema must be purposefully developed and practiced to the point of automaticity. The client must be an active participant in this process. The process is best accomplished with clearly defined learning outcomes and specific teaching strategies designed to reach those outcomes. Individuals learn better and develop efficient, subconscious rehearsal strategies when goals are clearly articulated.

Humans learn by pattern matching. Each meaning we construct makes us better able to give meaning to other stimuli which can match with a previously identified and categorized, similar pattern.

When we encounter a new stimuli the brain immediately begins to attempt to match it with what is already known. Humans pattern match between crucial issues in the environment and elements of mental schemata to determine which schemata will be accessed and used to append the new information. Classes of stimuli are grouped together in the brain. Clients seeking treatment often have whole classes of stimuli (schemata) that they react poorly to.

On occasion, increasing exposure and information can amend a schema or split it into two related schemata. Suppose, for example, you were afraid of all spiders and reacted with a great deal of anxiety to an appearance of any spider. Now suppose you were motivated by your new job at the arachnoid exhibit at the zoo and took the time to learn about spiders and found out which ones were dangerous and which were not. Eventually you would develop two highly related schemata, spiders which were dangerous and spiders which were not. The response patterns to these schemata would be different. NCLT therapy works in a similar fashion. The goal of treatment is to make the response patterns of individual's to specific schema explicit

so that they can be examined and modified. Maladaptive responses should be deconditioned, and adaptive responses practiced and automatized.

The construction of meaning is neurophysiologically based and involves brain circuitry dedicated to pattern matching, learning, and reinforcement recognition.

All information that is learned is processed over the same neural networks. There is no separate system for material learned in therapy, although there may be, as a result of the emotional valence of the material, different brain regions recruited for specific elements of what is discussed in treatment.

Specific recruitment of brain regions is not unique to learning in a therapeutic context, it is a characteristic of all learning. Regions responsible for emotional valence and reward recognition are not the exclusive domain of the material learned in therapy. These regions are recruited by any activity which is accompanied by a level of arousal. The regions which are responsible for reward recognition are critical in the gating process. Gating is the process that determines what information is accepted into working memory and therefore determines what material is available to be worked on in therapy.

Therapists knowingly or unknowingly provide encouragement, direction, and support.

Clearly the degree to which the relationship between the therapist and the client produces an environment for encouragement and support is a factor in determining the effect of therapy. It is clear that the therapists' approval and support is as source of reinforcement that is used by all therapists to guide and shape the course of learning.

The language we use influences learning. Language and learning are inextricably intertwined.

Language is a critical tool for the shaping and reshaping of thought and related emotional states. The directed, purposeful, and structured use of language is important for imparting information designed to change cognition. Obviously, the haphazard or inefficient use of this tool would produce less than optimal results. Therefore, those systems that make purposeful use of language are to be preferred to less directed systems where the expected impact of language is not planned, or in fact the use of language itself is minimized.

Learning in therapy is a social activity. To be useful, knowledge acquired in therapy must be applied and practiced within the context of both new and existing relationships.

There are two separate points here, the first of which is that learning is a social process with at least two active participants, and the second is that new learning must be practiced in those social contexts that it was intended to be used in. This practice must be purposeful and directed. New behavior must be practiced in the social world for it to be incorporated into the automatic repertoire of the learner. Such practice represents the core of a planned and purposeful therapy process. The learning outcome for the practice should be known to the learner so that the result of the practice

can be integrated into the appropriate body of existing knowledge. The goal is automaticity of new and adaptive behavior into the repertoire of the individual.

Learning in therapy is contextual. We learn in relationship to what else we already know and what we already believe.

In therapy it is not desirable to append adaptive knowledge to maladaptive preexisting knowledge. To be effective, new skill sets and their associated cognitions must be developed and practiced. In practice, this is difficult to do because humans show a strong tendency to hold onto prior knowledge and discount new knowledge that is not in agreement with prior knowledge. In other words, if the new knowledge disagrees with what I already know, I have a strong tendency to reject the new knowledge to protect my existing beliefs. Indeed, it can be argued that one purpose of knowledge is to develop attitudes and belief systems that are resistant to change, and that this rejection of new knowledge serves a valuable protective function.

In order to understand how this process works it is important to know that, as we have discussed, humans learn by pattern matching. When we first encounter a novel stimuli we search what we know, looking for similar patterns or constructs to relate it to. We then look at this information in light of what we already know. We can do of three basic things with this new knowledge. We can accept it and alter what we already know. We can reject it and protect what we already know. Or we can consider it and see how it fits in with what we already know.

As we have seen, humans have a propensity to protect what we already know and therefore, the most likely scenario when confronted with new information is to reject it outright. The second most likely event is to consider it, and see how it fits in with what we already know, and the least likely outcome is to accept the discordant new information and throw away, or irrevocably alter what we already know. Much of what the lay person thinks about when they think about therapy is defined by this last most unlikely outcome. People believe that the therapist will say something, and on the basis of that statement, a transformation of the maladaptive body of knowledge will occur. As we have just learned, this is both unlikely and counter to the actual tendency of people when they encounter new information.

What is more likely, and in fact therapeutically desirable, is that the client (learner) engages in the middle option. They will use the new information to see how it relates to what they already know. We do know a few things about how this occurs. One of the most important things is that for this objective analysis to occur, the learner must be motivated to do the comparison, and dispassionate about the analysis. The stronger the attitude is held, the more difficult the comparison is to make. In addition, beliefs associated with strong affect states lead to strongly held attitudes which are more resistant to change.

All of this goes to the point that in order to change the strongly held, emotionally laden belief systems that characterize the thinking of children with emotional problems, the children must be encouraged to do a systematic and dispassionate analysis of those belief systems in an environment or in a manner that does not threaten the child and cause the child to withdraw. New information must be just different

enough and minimally threatening enough to enable the client to process it while at the same time be both novel and interesting enough to encourage the allocation of working memory. This calls for a careful and thoughtful assessment of the type of new information, its purpose, and how it will be offered to the child. This argues persuasively that children should not be left to their own devices to filter the information provided in a therapeutic exchange, because their natural tendency will be to reject new information, or avoid comparison or questioning their passionately held attitudes.

The job of the therapist is, with the learning outcome clearly in mind, to systematically prepare the stimuli so that they meet the just right challenge and create an environment wherein the client is open to and engaged in confronting maladaptive attitudes and beliefs. By a process of shaping and desensitization, the therapist should present new information designed to challenge the existing attitude while at the same time not being threatening to it.

It is not possible to assimilate new knowledge without having some structure developed from previous knowledge upon which to build.

Learning is incremental, the more we know, the more we can learn. Therefore, any effort to teach must be connected to the state of the client, and must provide a clear, direct, and unambiguous path into the subject for the learner that emanates from the learner's (client's) previous knowledge. This implies that adaptive beliefs and constructs should form the basis of new learning, and that therapy should be directed towards both creating the functional beliefs, attitudes, and skill sets and then practicing those skill sets in multiple environments.

Learning occurs when some responses are trained and selected, and others are not trained and are deselected. Learning is effective when this process is directed and specific, with the learning paths specified and reinforced. Learning is then enhanced through a process of refinement of, and automatization of, these selected responses.

Learning new ideas and ways of behaving in therapy is not instantaneous.

Learning requires both practice and rewards. Clients must recognize old ideas as maladaptive, and actively seek to replace them with new ideas based upon a foundation of new learning and successful application. Research has suggested that learning new skills or changing existing cognitive schema is enhanced, in terms of increased automaticity, when new concepts are pulled into working memory and then used in multiple applications. In order to create these various applications, guided practice enhanced with behavioral practice improves learning efficiency. To effect learning and generalization of new constructs in therapy, highly structured and guided instruction is necessary to create the new schema. Only after the new schema is constructed it is beneficial to reduce guidance and structure.

Motivation is a key component in learning. Not only is it the case that motivation helps learning, it is essential for learning.

For NCLT, motivation is not the product of a mystical personality trait that certain individuals either have in abundance or in which they are deficit. For NCLT,

motivation reflects the operation of the reward recognition circuit which is either more or less efficiently integrated with behavioral circuits. Success brings reinforcement and the increased likelihood the action will continue to be selected in the future. Therapeutic progress therefore is facilitated when a planned program of increasingly complex actions is engaged in and reinforced. Motivation is therefore derived from successful practice and automatization of target behaviors designed to achieve a specific goal.

Maladaptive behavior and thought is based upon automaticity.

Automaticity is the goal of human learning. In this regard maladaptive thought and resulting behavior is no different than any other type of thought including adaptive thought. It is learned in the same way, expressed behaviorally in the same way, and automatized in the same way. The neural circuitry involved in its learning is the same neural circuitry that is involved in all other learning. From this we can conclude that the neural circuitry over which the maladaptive learning took place is functioning entirely appropriately. It is only that the learned connections lead to less than adaptive behavior and thought. Therefore, brains are not defectively permanently wired, or permanently damaged. It is not guaranteed that a person with an emotional dysregulation issue has a badly wired brain. In many instances a diagnosis merely implies that the current patterns of connectivity are the result of reinforcement patterns that have not produced adaptive behavior. NCLT posits that, in most instances, this is not a permanent condition. These pathways supporting maladaptive behavior can be altered by the same processes that supported their formation in the first place.

The ability to solve problems and the ability to adapt to novel situations are positively correlated with improved mental health.

Learning occurs when potential responses to environmental occurrences are reweighted with some responses being made more likely and other responses becoming less likely.

Both working memory and processing speed efficiency play important roles in this process. Deselection and reselection depends on the ability to suppress (deselect) newly identified task-irrelevant information as well as the ability to activate (select) newly identified task-relevant information. Efficient working memory results in material being held in working memory for a greater period of time and being increasingly available for modification. This leads to the potential for increased flexibility which in turn implies increased ability to evaluate novel solutions and consider new responses. It also suggests increased ability to select a new response to make automatic.

Therapy is cognitively demanding.

Deselection and reselection of a new process to make automatic (the process of therapy) is at first a conscious, planned, and time-consuming process. An individual who is attempting to eliminate a maladaptive, automatized process such as a complex maladaptive behavioral response or thought will struggle due to the required cognitive effort. It is likely that they will become even more inefficient and

ineffective as they shift from their maladaptive strategies to newer, potentially effective but not yet automatic cognitive processes.

Learning is about connections in that what is stored together stays together in memory.

Learning new things in therapy as in all other learning occurs in context. What is learned is associated and remembered in the context of what was around it during the time it was encountered. Therefore it is critical to the process of therapy that newly learned adaptive responses should be practiced in as many new contexts as is possible. This practice should be a planned and purposeful part of treatment and not just be left to circumstance.

The basic principles of learning for NCLT are:

1. Learning is a product of working memory allocation
2. Working memory's capacity for allocation is affected by prior knowledge
3. Working memory allocation is directed by motivation

NCLT offers the following as rules that govern the process of knowledge acquisition in therapy.

How things are presented and grouped in working memory determines what procedures will be developed from their association.

If knowledge is retrieved, all other elements of knowledge to which it is connected are retrieved, and all connections between them are strengthened.

If parts of retrieved knowledge match to working memory contents, the connection between the existing knowledge and the new material are strengthened. If parts of retrieved knowledge do not match to contents in working memory, the connections are weakened and inhibited. Establishing new pattern matches (schemata) is an essential component in therapy.

If an action is successful, its connection to the knowledge of the situation in which it occurred is strengthened. If an action is unsuccessful, its connection to the knowledge of the situation in which it occurred is weakened or inhibited. The therapeutic implication of this is that new procedures must be understood and conscientiously practiced.

If knowledge has been retrieved, new information in working memory will be connected to this knowledge. This is the basis of establishing new adaptive procedures.

Any active knowledge in long-term memory is accessible to working memory.

The Goal of Therapy Is Also Competence

The term competence has been used to refer to accumulated learning experiences that result in a pattern of effective adaptation within an environment. Within the NCLT clinical context, it implies that the individual has (or lacking competence does not have) the capability to perform well in the future. Like many cognitive therapy models NCLT posits that an individual who lacks competence in an

environment becomes self-aware and engages in negative self-appraisals. These negative self-appraisals are reinforced and reproduced regularly until they are automatically associated with a class of behaviors or physiological responses. NCLT theory hypothesizes that these automatically associated physiological responses and appraisals are experienced as affect states such as depression and anxiety. That is, in part, because the physiological responses associated with these affect states are also associated, through the same principles of learning, to the cognitions associated with the appraisals.

The Fourth Wave?

Given its ability to integrate most therapeutic models within its conceptual framework, it might be possible to describe NCLT as the beginning of a “fourth wave.” These would be models that were able to describe the multiplicity of factors that contribute to the development of mental functioning in people, while including the ever increasing contributions of neuroscience. In addition, these models have the potential to incorporate and explain all intervention techniques under one coherent framework. This wave will have the capacity to not only conceptualize a case presentation and apply interventions, it will conceptualize a case presentation from a contextual and life course model, apply interventions specifically targeting particular schemas, and be able to teach the principles underlying both maintaining the presentation of the issues and how to impact their resolution. This wave integrates psychology and neuroscience, producing an empirically validatable and validated theory and therapy.

Index

A

Acceptance and commitment therapy (ACT), 129–131
Algorithmic Efficiency Theories, 82–83
American Psychological Association, 98
Anxiety-based disorders, 52
Attention-deficit/hyperactivity disorder (ADHD), 52, 61, 107
Automaticity, 77–82

B

“Bear in the Woods Paradigm”, 137, 139, 141
Blocking, 58

C

Canon-Bard model, 56
Cognitive behavior therapy, 123–125
Cognitive disputation, 127–128
Cognitive disputational techniques, 64
Cognitive primacy, 139
Coherence therapy, 126–127
Competence, 28–29
Core flexible networks, 30
Cue competition, 58

D

Decision making, 59–60
Depathologizing Psychopathology, 3, 44, 62, 90, 176
Depression, 51, 169
Dialectical behavior therapy (DBT), 65–66, 132
Disease and disorder, 90–91

dorsolateral prefrontal cortex (DLPFC), 62
Dual Process Theory, 150

E

Eclecticism, 39, 40
de-consolidation, 42–43
integrating psychotherapy techniques, 41
integrative approaches, 40–41
NCLT, 43, 44
problems, 40
Emotional primacy, 138–139
Evidence-based practice (EBP), 62

F

Flexible Battery in Forensic Context, 171

H

Hayes’ third wave model, 122, 123
Human connectome, 31

I

Integrating Psychotherapy Techniques, 41

K

Knowledge, 26

L

Life Course Theory and NCLT Treatment, 51–52
ADHD, 52
anxiety-based disorders, 52
depression, 51–52

M

- Memory
 - consolidation, 70
 - linkages, 72
- Memory reconsolidation, 69–73, 75, 76, 125–126
 - and NCLT, 73–74
- Mindfulness-based cognitive therapy, 122
- Motivation, 26
- Multiatribute attention switching (MAAS)
 - model, 57, 58
- Myelin, 169

N

- Neurocognitive Learning Therapy (NCLT), 3, 8–10
 - “Aha” Moment, 17, 19
 - Algorithmic Efficiency Theories, 82–83
 - and algorithms, practice, 33–34
 - automaticity, 10–12, 77–82
 - and Canon-Bard theory of emotion, 56
 - clinical procedures, 121
 - acceptance and commitment therapy, 129–131
 - cognitive behavioral techniques, 123–125
 - coherence therapy, 126–127
 - dialectical behavior therapy, 132
 - fourth wave, 132
 - memory reconsolidation, 125–126
 - real-time recognition, 127
 - third wave, 121–123
 - common core, 4–5
 - connectome and, 30–31
 - core flexible networks, 30
 - and cue competition, blocking, 58
 - and decision-making models, 57–58
 - and Dialectical Behavior Therapy, 65–66
 - and epigenetics, 36
 - and importance of reward, 57–58
 - and Memory Reconsolidation, 73–74
 - and NCLT, 25
 - principles, 6–7, 137–138
 - process of therapy, 5
 - and psychotherapy integration, 97–98
 - reward recognition and motivation, 19–22
 - rules of learning, 27–28
 - semantics, 7–8
 - stresses adaptation, 91
 - teaching oriented model, 6
 - and therapeutic practice, 75–76
 - therapist and patients, 12–16
 - therapists, 89–96, 98, 158
 - practice of therapy, 93–96
 - stress, 94

therapy

- case example, 108–111, 113–119
- client needs, 105–106
- diagnosis, 103–105
- history, 103
- and therapy process, 35
- treating children, 149–153
 - building resilience, 155–156
 - case example, 161–165
 - role of parents and teachers, 154–155
- treating teenagers, 160–161
- triggers, 79
- unique system, 3–4
- vertical brain-based therapy
 - principles, 83, 84
- working memory in therapy, 29

O

- Obsessive Compulsive Disorder, 79
- Orbitofrontal cortex (OFC), 59

P

- Parables, 135, 136
- Pediatric psychologists, 173
- Probabilistic Reward Theory, 144

R

- Reward and Decision-Making Network, 60–61
- Reward Decision Making and Emotion, 62

S

- Schema-focused therapy, 123
- Signal detection theory, 144
- Small world hub models, 32, 82

T

- Technical Eclecticism, 97
- Therapy parables, 142
- Triggers, 79

U

- Unified Learning Model (ULM), 25

V

- Ventromedial prefrontal cortex (vmPFC), 62
- Vertical brain-based therapy
 - principles, 83, 84