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This book is a real tour de force of reuniting empirical evidence and theoretical models embedded in clinical wisdom, leading to inspiring perspectives of how to study change in psychotherapy in the future. Lane and Nadel, the co-editors of this volume, have provided the field with a convincing perspective into the next generation of studies on neuroscience of enduring change. The future-pointing character of this book is substantiated by at least four aspects which will be discussed below. The editors have collected 16 chapters written by world-leading experts in the domain of neuroscience of enduring change, both from basic sciences and clinical sciences. The result is a kaleidoscope of contributions to explain enduring change through psychotherapy, which is a sourcebook for researchers and clinicians alike. Topics such as the interaction between emotion and memory, different types of memories from a process-perspective, the impact of sleep on memory changes, a computational perspective on memory reconsolidation, emotion transformation in psychotherapy, inhibitory and regulatory models of emotion in psychotherapy and the origins of relationship schematic patterns and their change in psychotherapy are discussed in this book. Across all these topics, the editors went to considerable lengths to ensure that basic science chapters established linkages with clinical practices, and, conversely, that chapters focusing on psychotherapy practice accurately referenced basic science concepts. There are
four reasons why this contribution is important for the next generation of studies of enduring change in psychotherapy.

*Psychotherapy change is a multilevel neurobehavioral phenomenon.* Clients seek psychotherapy because of either lack of skills to cope with a specifically challenging life situation, or in order to deepen their understanding of themselves. Their current lives are shaped, or constrained, by the experiences they have had in the past and, oftentimes unwillingly, they tend to repeat, in the present, their old ways of responding and interacting. Without therapy, clients often continue to do so, in ways that not only shape their present relationships, but most likely also point into the future: more of the same old experiences with little chance of being able to quit these self-defeating negative cycles.

This is where memory reconsolidation as a possible explanation of how psychotherapy works is a particularly promising avenue. Neurally determined schematic maladaptive patterns predict the person’s current experience and shape their in-situ responses to interaction partners. These interaction patterns and experiences, while acquired in early attachment relationships, are stored as long-term memory structures, implicating the complex interaction between the hippocampus, the amygdala, the precuneus and the pre-frontal cortex, and are ready to influence human behavior and experience on implicit levels. In privileged moments – and a number of psychotherapy approaches are discussed in the book to explain how these may be created deliberately – these memory structures enter a labile state and can be updated and changed. While researchers are still unclear what the neuronal underpinning of this updating process is, it is assumed that the hippocampus and the amygdala are implicated to form a corrective emotional experience in the here and now which undoes, and contradicts, the predictions of the old memory of how, for a given individual, interaction with other humans may work.
This book provides a model of the vital interactions between the neurofunctional dynamics and the neuroanatomic features on the one hand and the observed interactional behaviors clients engage in on the other. This is a convincing and multifaceted hypothesis of change which could take the lead in the next generation of psychotherapy research on the processes of change.

_Psychotherapy research as integration-fostering science._ This book provides a clear account of how vital psychotherapy integration for the advancement of science is. While at first glance, psychotherapy integration certainly fosters a coherent scientific understanding of psychotherapy, it goes beyond the clinical sciences and may also contribute to illuminate the basic sciences of emotion and memory. The study of processes of change in psychotherapy, such as emotion transformation (chapter by Pascual-Leone et al.) and memory change in exposure therapy (chapter by Huppert et al.), by their focus on the interactional behavior the clients display in session, contributes to the building of a broad theory of how psychotherapy works. This knowledge may not only be relevant to specific forms of psychotherapy, but may actually become evidence-based principles of change which may be active in any helping context, to variable degrees. It may therefore be used by therapists from a variety of backgrounds, including psychodynamic therapy (chapter by Levenson et al.), coherence therapy (chapter by Ecker) or specific therapies such as the unified protocol or schematherapy (chapter by Goldman et al.). In particular, clinicians may find the proposed model of change useful in clinical contexts such as when therapy has stagnated or when client’s clinical conditions deteriorates.

Psychotherapy research focusing on processes of enduring change, such as phenomena related to memory reconsolidation, may feed back into basic science of emotion and memory, as well. Knowing about the regularities of productive change in long-term memories, or the productive change in arousal, through psychotherapy, may inform experimental designs in
unexpected manners. For example, the observation that corrective emotional experiences are important to produce change in psychotherapy may be modeled using methods from computational neuroscience in terms of priors, or stable predictors in the model, which may be tested on the level of the brain (chapter by Smith et al.), for example by examining the role of the amygdala when confronted with novel information contradicting an interaction assumed, by the individual, as negative. Such perspectives may in turn inform affective neuroscience models of the role of the amygdala for modulating arousal facing novel information.

*Emotional change as engine of psychotherapy change.* Among all the factors which have been studied to explain psychotherapy change, one of the most promising candidates is emotional change. Emotional change is particularly promising because a) emotional activation is a biologically-wired system affecting attachment, communication, long-term schematic patterns and level of distress, b) aspects of emotional change are discussed in all major models of psychotherapy, c) process-outcome research, along with controlled studies in psychotherapy research, speak to its relevance, and d) its central role for updating memory (although the latter point has been challenged, see chapter by Ecker). Emotion may be differentiated from affective responses: from a socio-constructivist viewpoint, emotion may even be a culturally constructed process mediated by language. Words make emotions, to paraphrase the chapter by Satpute et al. Changes therein – which may take the form of narrative change (see chapters by Levenson et al., and by Pascual-Leone et al.) – are therefore important. However, a number of research questions remain open. What is the optimal time frame to study the core emotional change? Are all emotions changed in similar ways and are all emotion categories similarly important for explaining psychotherapy change? Which component of emotional change most strongly affects the process of memory updating (Lane et al. suggest emotional arousal, but are there others)?
Memory reconsolidation has the potential of explaining lasting change due to psychotherapy. Finally, let me come back to the title of the book by Lane and Nadel. The notion of enduring change is indeed central there: while intuitively appealing to psychotherapists (and their clients; who does not want to get rid of, once and for all, maladaptive interaction patterns?), this notion is at the same time rather uncomfortable for psychotherapy researchers. Research in the domain of depressive, addictive and anxiety disorders report consistently good effect sizes for change due to psychotherapy, but recurrence of symptoms, while much less frequent after psychotherapy than after pharmacotherapy, still remains probable in many cases. The situation is a bit different for personality disorders, which have lower recurrence rates after psychotherapy has ended, but also there, very little is known about the shape of the long-term evolution and the impact of memory processes on the evolution of distress. Here this book can be understood as a call for taking recurrence in psychiatric disorders seriously. If psychotherapy researchers want to be even more useful to the daily practice of psychotherapists, and their clients’ experience, a focus on how memory updating can lead to lasting, years-long, maybe once-and-for-all, change, is needed.

I think the field owes much to the editors of this volume for providing us with the state of the art and debates related with memory reconsolidation and lasting change, by drawing on expertise in the basic sciences, neuroscience, and psychotherapy research. It is an inspiring call for researchers to examine the open questions outlined in the final chapter – a glimpse of what the future of psychotherapy research may look like – and a hopeful message to psychotherapists and their clients that lasting change may be within their reach.