Chapter 10

Psychological Transformation in Buddhism and Yoga

Johannes Bronkhorst

Freedom is a central notion in many religious and philosophical movements of classical India. It usually concerns freedom from rebirth and karmic retribution, a freedom that advanced practitioners are believed to attain at death. Certain movements, however, accept that freedom can be attained while one is still alive, by undergoing a transformation. As a consequence of this transformation, which is thought to be permanent and irreversible, the person concerned, still alive, is now liberated. The transformation concerned is often of a mental, or psychological, nature.[1]

Psychological transformations are the business of psychology. The question to be addressed in this article is: Can modern knowledge about psychological transformations help us understand some of the early Indian texts better?

What does modern psychology know about permanent and irreversible transformations? While classical forms of psychotherapy – first among these Freudian psychoanalysis – assumed that certain permanent psychological changes can be induced in human beings, neuroscientists tended to remain skeptical. They held that essential psychological features – including those based on the memories that contributed to the formation of our personalities – were laid down in unchangeable synaptic connections between neurons. This conviction itself has now changed. During the last twenty years or so a discovery has found its way into neuroscience and psychology that is known by the name *memory reconsolidation*;[2] in 2012 a researcher called it "one of the hottest new theories of the past decade."[3] Experiments on animals and subsequently on humans have revealed that during a short while after the reactivation

1 I am not sure if O'Brien-Kop's (2022: 28) claim that "any doctrine of liberation is, by definition, metaphorical" is helpful.

2 For a recent discussion, see Nadel & Sederberg 2022.

3 Alison Winter 2012: 264. Cp. Nadel 2007: 180: "there is no such thing as a fully consolidated and hence 'fixed' engram." In spite of the newness of the discovery of memory reconsolidation, Sigmund Freud wrote already in 1896 about "the material present in the form of memory traces being subjected from time to time to a *rearrangement* in accordance with fresh circumstances – to a *retranscription*" (Letter from Freud to Fliess, December 6, 1896; https://pepweb.org/browse/document/ZBK.042.0207A?index=100)

of memories their emotional contents can be permanently modified.[4] During this so-called *reconsolidation window*, which can last from minutes up to a few hours,[5] such a change can be brought about by pharmacological means (by so-called protein synthesis inhibitors, such as propranolol)[6] or through new competing learning. A condition for such a change, it appears, is that the reactivated memory be confronted with what is called a *mismatch* or *prediction error*; that is to say: the reactivated memory is not accompanied by its expected outcome.[7] Indeed,

> therapeutic change in a variety of modalities, including behavioral therapy, cognitive-behavioral therapy, emotion-focused therapy, and psychodynamic psychotherapy, results from the updating of prior emotional memories through a process of reconsolidation that incorporates new emotional experiences.[8]

Here is a short description of how memory reconsolidation can be used in the case of humans:

> Studies examining the behavioral interference of emotional memories in humans have explored both conditioned aversive memories and appetitive memories. A common nonpharmacological technique to change conditioned emotional reactions is extinction training. Extinction involves recurrent presentations of the CS [*conditioned stimulus*] without aversive or appetitive outcomes, which leads to a gradual decrease in the CR [*conditioned response*]. Similar to acquisition, extinction is a learning process, but now the CS is associated with no aversive or appetitive outcome. Importantly, *there is abundant evidence that standard extinction training results in an additional memory trace representing an alternative for the CS* (e.g., safe). Because the initial aversive or appetitive memory trace still exists, the CR can return after extinction training in a number of circumstances

4 Cogan *et al.* 2019. Memories can alternatively be more solidly consolidated. This happens in sleep, one of whose functions appears to be to "consolidate [new memory traces] into more permanent forms of long-term storage, integrating key features of recent experience with existing remote and semantic memory networks" (Wamsley & Stickgold 2011: 2). Significantly, this kind of memory consolidation takes place in NREM (non-rapid eye movement) sleep, i.e., not in dreams and therefore without consciousness intervening. In the case of motor skill memory, it leads to instinctual habits. Consciousness, it appears, is required to re-consolidate and potentially change memory, not to consolidate it to begin with. This happens, to at least some extent, in dreams about upsetting memory experiences, which reduce the emotional charge of those memories. See on all this Walker 2017: 112–132, 204–212; see also Solms 2021: 229.

5 Phelps & Hofmann 2019: 45.

6 Pharmacological means are rarely used in humans. Kindt *et al.* 2009 is among the exceptions. See also Ecker 2018: 22.

7 There is an extensive literature about all this. See, e.g., Lee *et al.* 2017; Exton-McGuinness *et al.* 2015; Fernández *et al.* 2016; Elsey *et al.* 2018; Sinclair & Barense 2019.

8 Lane *et al.* 2015: 1.1

> *… However, if extinction training occurs during reconsolidation while the memory is still labile, it is possible that this new information will get incorporated into the original memory trace, thus updating the original emotional memory and changing its emotional significance.*[9]

In this last case one speaks not of *extinction* but of *erasure*.[10] It is important to remain aware of the difference between the two. Extinction normally creates an additional memory trace.[11] It *only* results in erasure – and therefore in a change in the original memory trace – *if* it is applied during the reconsolidation window.[12]

All of this is, of course, grist for the mill of psychotherapists. Consider the following:

> Defining complete elimination of unwanted emotional responses as the goal of psychotherapy is a statement that no neuroscientist would have ventured to make prior to 2000, before the discovery of memory reconsolidation. It is a goal now recognized as a possibility grounded in empirical research. That goal is the operational definition of erasure …: lasting, effortless, complete cessation, under all circumstances, of an unwanted behavior, state of mind, and/or somatic disturbance that had occurred either continuously or in response to certain contexts or cues.[13]

The first target of psychotherapies that use this procedure is, of course, to find and identify the memories ("implicit memories")[14] that underlie symptoms. Symptoms, and habits in general, are automatic responses. Anyone who has ever learned to ride a bicycle can confirm that consciousness is required before the appropriate automatisms have been established but is no longer necessary after that.[15] Memories that underlie symptoms are emotional memo-

9 Phelps and Schiller 2013: 199; my emphasis.

10 See further Dunsmoor *et al.* 2015: 54–56.

11 The term "extinction" is strictly speaking "a misnomer that creates misconceptions, … because it produces none of the effects that have been identified with the term 'extinction' for a century" (Ecker 2018: 26).

12 It is possible that the engram underlying the original memory trace survives in a "silenced" state, but they will no longer be accessible; Frankland *et al.* 2019.

13 Ecker 2018: 3. Alberini (2015) has some reservations about the extent to which memory reconsolidation can be used in therapy; see also Schacter 2021: 305–311.

14 Schacter 1987; Cubelli and Della Sala 2020.

15 Cf. Earl 2014: 1: "Consciousness is associated with a flexible response mechanism … for decision-making, planning, and generally responding in nonautomatic ways." Kanai *et al.* 2019: 1: "consciousness emerged in evolution when organisms gained the ability to perform internal simulations using internal models, which endowed them with flexible intelligent behavior." Solms 2021: 190: "Affective valence – our feelings about what is biologically 'good' and 'bad' for us – guides us in *unpredicted* situations. …[T]his way of feeling our way through life's unpredicted problems, using

ries.[16] Many of these are hidden from consciousness and need to be found.[17] This is not always simple. And yet, "[a]ttempting to prevent or reduce a symptom with counteractive methods that leave the underlying memory material intact positions a therapy client to be prone to relapses."[18]

A complicating factor is that symptoms are not always (if ever) the result of one single memory. There are networks of memories.[19] This is not the place to enter into these complexities.

Reconsolidation in Buddhism and Yoga

This then is, in short, what is known about memory reconsolidation and the way it can bring about permanent and irreversible changes in the human (and animal) psyche. Can it help us understand early Indian texts that speak about such changes? Some preliminary observations are required.

The first thing that must be emphasized is that none of the Indian texts and movements to be considered offer anything that we might call psychotherapy. Their aim was not to deal with the kind of symptoms that modern psychotherapy tries to resolve, and it is often far more radical. Early Buddhist texts are particularly clear about this. Successful practice results in the end of suffering and the end of desire. This difference must be kept in mind in what follows.

The belief that a state of freedom can be attained *before death*, while one is still alive, explicitly found its way into certain Brahmanical currents of thought from a relatively late date

voluntary behaviour, is the biological function of consciousness." Solms 2015: "conscious reflection upon an automatised motor programme undermines the intended behaviour because it destabilises the underlying programme. … Biologically successful memories are reliable predictive algorithms … There is no need for them to be conscious." Solms 2019: 13: "[Consciousness] is a sort of alarm mechanism, which guides the behavior of self-organizing systems as they negotiate situations beyond the bounds of the preferred states, in so far as they are not equipped with automatized (or automatable) predictions for dealing with them." For an example of unconscious memory, see the chapter "Uncovering secrets: the problem of traumatic memory" in Van der Kolk 2014: 205–220.

16 Staniloiu, Kordon and Markowitsch 2020: 4. Even though memories can be forgotten (Ryan and Frankland 2022), this appears to be less true of emotional memories.

17 Ecker 2018: 3.

18 Ecker 2018: 7.

19 "… fear memories consist of *multiple elements that become interweaved within a broad associative network*." (Dunsmoor *et al.* 2015: 56; my emphasis). Note further that "what is erased through the reconsolidation process is a specific, learned schema or model or template of reality … That schema [is] the target for erasure … With dissolution of the schema, the negative emotions that it [is] generating … [disappear], though those emotions [are] not themselves the target for mismatch or erasure …" (Ecker 2015: 29).

onward.[20] It is commonly referred to by the name *jīvanmukti*, which means: freedom while alive. According to many texts, one reaches that state by means of a special kind of insight into the nature of reality. Memory reconsolidation plays no obvious role in these transformations.

Jainism and Buddhism deserve special attention apropos this topic. Both have a lot to say about irreversible changes that can be brought about and guarantee that the person concerned, though still alive, will not be reborn. Strictly speaking, Jainism does not speak of freedom in this connection; it reserves this term for the shedding of the last remains of karma (conceived of as a form of matter) at death.[21] This is a terminological nicety that does not concern us at present. However, features Jainism attributes to those who have undergone the crucial transformation are such that memory reconsolidation cannot easily be invoked to explain them. Such persons are claimed to be omniscient (literally) and in the possession of a highly resilient and ironlike physical structure. Some add that they do not engage in normal bodily activities, including eating.[22]

Buddhism is more promising in this respect. It can be argued that at least one path toward the goal presented in its early texts involves memory reconsolidation.[23] The method it proposes does not resemble modern therapeutic practice, to be sure, to say nothing about the use of propranolol or other pharmacological substances. Broadly speaking, the Buddhist path uses meditation, but it does more. Meditational practices – mindfulness and mental absorption – are the *tools* that lead practitioners to a state in which they can bring about the final transformation. Mindfulness and absorption are *preliminaries* and do not by themselves bring about this transformation. How this is done is described in the following frequently recurring passage, sometimes put in the mouth of the Buddha:

> Then, when my mind was thus absorbed, pure, cleansed, free from blemish, without stain, supple, ready, firm, immovable, I directed my mind to the knowledge

20 "While not without ancient precursors, *jīvanmukti* was first celebrated and popularised by the 11th century *Mokṣopāya* (later known as *Yogavāsiṣṭha*) and by the seventeenth century had become a topic of discussion in every school of Hinduism … *jīvanmukti* is a central goal of Haṭha texts" (Singleton 2021: 125; cf. Mallinson and Singleton 2016: 251–253). See further Bronkhorst forthcoming. The *Yogaśāstra* (= *Yogasūtra* + *Yogabhāṣya*) is an exception, for which see below. Interestingly (and confusingly), the *Mahābhārata* presents King Janaka of Mithilā as someone who claimed (though falsely) to have gained *mokṣa*; see Fitzgerald 2003. See also Bronkhorst 2010; 2016: Appendix V. Philipp Maas draws my attention to *Sāṃkhyakārikā* 65–67, where the reference to a liberated, yet living, person seems beyond doubt.

21 Dundas 2020.

22 Dundas 2002: 104ff.; Bronkhorst 2020: 179.

23 The early Buddhist texts present a number of paths; see Gethin 2020; further Shi 2021. The path here highlighted is the one that Gethin calls the "Tathāgata appears" scheme; for details see Bronkhorst 2009: 12–19. Other Buddhist paths are discussed in Pecchia & Eltschinger 2020; Buswell & Gimello 1992. Buswell and Gimello (1992: 7–8) present some of the best-known Buddhist *mārga* schemes.

> of the destruction of the influxes (*āsava*; Skt. *āsrava*). Then I recognized in accordance with reality "this is suffering," I recognized in accordance with reality "this is the origin of suffering," I recognized in accordance with reality "this is the cessation of suffering," I recognized in accordance with reality "this is the path leading to the cessation of suffering." I recognized in accordance with reality "these are the influxes," I recognized in accordance with reality "this is the origin of the influxes," I recognized in accordance with reality "this is the cessation of the influxes," I recognized in accordance with reality "this is the path leading to the cessation of the influxes."[24]

Can psychology, including the new knowledge about memory reconsolidation, help us make sense of this?

It can, if we make two assumptions. The first is that the practice of meditation here set forth can facilitate access to mental contents, especially memories and their networks that are not normally easily accessible to consciousness. The second is that, once there is access, these memories can be emptied of their emotional charges.

To begin with the first assumption, conscious access to memories (along with their emotional charge) is the precondition for memory reconsolidation. Only thus can these memories be reactivated, and only reactivated memories can be reconsolidated. Do mindfulness and absorption provide access to such memories?

We can be brief about mindfulness. Modern therapists who work with memory reconsolidation, too, use it as a tool.[25] However, modern therapy provides access to one emotionally charged memory at the time (or to a limited number of them), often after several preparatory therapeutic sessions. It may not have the means to gain access to a whole lot of them (not to speak of all of them) in short succession.[26] Mindfulness by itself, though essential, may not be sufficient.

24 *Majjhimanikāya* vol. I, p. 23: *so evaṃ samāhite citte parisuddhe pariyodāte anaṅgaṇe vigatūpakkilese mudubhūte kammaniye ṭhite āneñjappatte āsavānaṃ khayañāṇāya cittaṃ abhininnāmesiṃ | so idaṃ dukkhan ti yathābhūtaṃ abbhaññāsiṃ ayaṃ dukkhasamudayo ti yathābhūtaṃ abbhaññāsiṃ, ayaṃ dukkhanirodho ti yathābhūtaṃ abbhaññāsiṃ, ayaṃ dukkhanirodhagāminī paṭipadā ti yathābhūtaṃ abbhaññāsiṃ | ime āsavā ti yathābhūtaṃ abbhaññāsiṃ, ayaṃ āsavasamudayo ti yathābhūtaṃ abbhaññāsiṃ, ayaṃ āsavanirodho ti yathābhūtaṃ abbhaññāsiṃ, ayaṃ āsavanirodhagāminī paṭipadā ti yathābhūtaṃ abbhaññāsiṃ |*. Cf. Bronkhorst 1986: § 8.4.3; 2009: 18–19.

25 See, e.g., Ecker *et al.* 2012: 9–10: "these hidden learnings soon come into the client's awareness in the retrieval work, in part through use of specialized mindfulness practices"; similarly, p. 53: "mindfulness practice would continue to firm up … integration of the pro-symptom emotional learning [once] retrieved"; etc.

26 In the case of "trauma processing, the client repeatedly cycles through [a number of phases] with each new target memory" (Baldwin & Korn 2021: 149). Note that memories are not verbalized in all therapies: "People may be able to heal from trauma without talking about it" (Van der Kolk 2014: 303). See further Jellestad *et al.* 2021.

Absorption appears to be different. Mental absorption can have varying degrees of depth.[27] It reduces or even suspends associations with other mental contents: the greater the depth, the more associations with other mental contents it can suspend. This includes, in the case of deep absorption, associations with mental contents that are not normally accessible to consciousness.[28] This would mean that deep absorption, unlike "normal" consciousness, *has access* to such mental contents. Moreover, mental absorption does not only suspend, it also focuses attention; presumably it can focus attention on some of those hidden mental contents.[29] This would imply that in a state of deep absorption, attention *can* be focused on hidden memories, memories of which one is not aware.[30] This, I propose, justifies our first assumption.

Turning now to our second assumption (memories can be emptied of their emotional charges), the possibility of access through absorption does not automatically lead to memory reconsolidation. But once there is access, these memories *can* be emptied of their emotional charges through memory reconsolidation. This, it may be recalled, is exactly what memory reconsolidation is all about. What I suggest at this point is that memory reconsolidation is what is meant by the expression "destruction of the influxes."

We can now conceptualize what supposedly happens, as follows. The practitioner, while in a state of deep mental absorption, directs attention to emotionally charged memories (or memory networks) in short succession. Each of them is reactivated, and the emotional charge is replaced with a neutral one, neither aversive nor appetitive, thus producing "prediction error." This is parallel to what happens in successful psychotherapy that uses memory reconsolidation. But presumably there is an important difference. We may assume that in this state of deep absorption access to hidden memories is easier, more direct, so that far more memories can be dealt with in quick succession. Remember that the person concerned has abandoned all attachments and sources of concern during preliminary practice, well before she reaches this stage. This would allow her to associate neutral feelings ("prediction errors") even with memories that so far had looked threatening or enticing, thus replacing the original emotional charge. Once this has been accomplished for all emotionally charged memories, the state of freedom is reached.

This, I submit, is an interpretation of these early Buddhist texts that makes sense in the light of modern neuropsychology. It does not tell us by what means or practices the practi-

27 See, e.g., Mohr 2018.

28 For details, see Bronkhorst 2022, esp. § 4.

29 Bronkhorst 2017: 10–11. Cp. Dehaene 2020: 154: "Attention acts as an amplifier and a selective filter."

30 Among those hidden mental contents, we may count memories of overwhelming traumatic stress that are subject to dissociative amnesia, but that can be recalled in state-dependent memory (wherein memories are difficult to recall unless the conditions at encoding and recall are similar); see Radulovic *et al.* 2018. Overwhelming traumatic experiences share certain features (speechlessness, no sense of time; see Van der Kolk 2014: 50ff.) with states of deep absorption (Bronkhorst 2022) (itself often looked upon as a state of dissociation) and may therefore be more easily recalled in such a state.

tioner is supposed to reach the depth of absorption required to set the process of transformation in motion. It also leaves open the question about what kind of personality – or indeed, what kind of person – would result from such a procedure according to neuropsychology.[31] At this point the Buddhist texts are clear: the person who has gone through the whole of this process will be without desire. Desire – or thirst (*tṛṣṇā*) as the texts call it – is that which stands in the way of freedom, and the freed person does not have it any longer.[32] Another characteristic of such a person, still according to those texts, is absence of suffering. Since the Buddha himself is recorded to have suffered (literally) from ill health toward the end of his life, we may assume that it is primarily mental, or psychological, suffering that is eliminated according to those texts.[33]

Our attempt to read these early Buddhist texts in the light of modern neuropsychology has led us to a possible understanding of what was once meant by "influxes" (*āsrava*) and of the process that leads to their destruction. We can now think of the process in terms of memory reconsolidation, and of the influxes themselves as the emotionally charged memories that are erased.

The Buddhist path we have considered does not specify any liberating insight. Other early Buddhist texts do. Indeed, a variety of different liberating insights are mentioned at different places in the ancient canon. These include knowledge of the four noble truths; awareness that the five aggregates appear and disappear, that they are empty, void, and without substance; understanding of the doctrine of conditioned origination; or comprehension of the selflessness of the person.[34]

I propose the following explanation for this strange state of affairs. We are not the only ones who found the passage about influxes and their destruction difficult to understand. Many Buddhists, already at an early stage of the development of that religion, felt the same. They felt more at ease with a specific insight that supposedly guaranteed access to freedom. Since the

31 Freud (1937: 219–220; referred to in Lopez 1992: 182) talked of "a level of absolute psychical normality – a level, moreover, which we could feel confident would be able to remain stable, as though, perhaps, we had succeeded in resolving every one of the patient's repressions and in filling in all the gaps in his memory." Freud's normality is not quite what the Buddhist texts promise.

32 Indeed, according to the second Noble Truth, suffering is due to thirst, i.e., desire, and according to the third, cessation of the former can be brought about through the latter's complete annihilation. For more on desire, see below.

33 The Buddhist tradition makes no secret of the fact that the historical Buddha apparently suffered from ill health toward the end of his life (and that indeed he *did suffer*). According to the *Mahāparinibbānasutta*, having eaten his last meal "the Lord was attacked by a severe sickness with bloody diarrhoea, and with sharp pains as if he were about to die. But he endured all this mindfully and clearly aware, and without complaint" (tr. Walshe 1987: 257; this translates *Dīghanikāya* vol. II, p. 127–128). During an earlier bout of illness, the Buddha supposedly said that his body only knows comfort when he enters into mental absorption (*Dīghanikāya* vol. II, p. 100; for a translation, see Walshe 1987: 245).

34 Bronkhorst 2009: 30–31.

earliest sources do not clearly describe such an insight, these Buddhists came up with a variety of them, often linked to the elements of Buddhist doctrine that each of them considered most important. The goal of the Buddhist path, in their view, was to obtain that supreme insight. Those who emphasized the path of meditation followed by the destruction of the influxes may soon have become a minority.[35]

An interesting story in the ancient canon illustrates and confirms this.[36] Here two monks – Musīla and Nārada – are questioned about their spiritual state. We learn from Musīla's answer that he has attained direct insight into the central tenets of Buddhist doctrine and now thinks that his influxes have been destroyed. Nārada, too, has attained those insights, but rejects the conclusion that his influxes have been destroyed. He explains this with the help of a simile. Just as when a man who is hot and thirsty finds a well in the wilderness, he sees the well and knows that it contains water, but alas, he cannot reach and touch the water, in that same way he, Nārada, has not reached the goal despite his insights.

The subsequent history of Buddhism in India illustrates the importance that came to be attached to correct insight, sometimes at the expense of meditational practice. Theoretically, the idea of the destruction of the influxes was maintained in some schools, as in the scholastic elaborations of Abhidharma Buddhism. To quote Collett Cox:

> each of the extensions and refinements of the path-structure [in Sarvāstivāda-Vaibhāṣika] should be seen as a systematic elaboration of methods still guided by what appears to be the original soteriological goal of the destruction of the fluxes (*āsravakṣaya*), rather than as an attempt to displace this goal and erect either concentration or knowledge as the ultimate religious objective.[37]

Certain Buddhists went on practising meditation, but the destruction of the influxes appears to have received ever less attention.[38] In other words, the practice of memory reconsolidation, if it survived at all, became ever less important in the Buddhist traditions.

To find further evidence for the use of memory reconsolidation in Indian religious literature, we look for a combination of absorption and mental reprogramming, with the former being a precondition for the latter. There are many texts, both in Buddhism and outside of it, that speak about absorption.[39] But few treat absorptions as a preliminary to a procedure that

35 Kuan (2008: 140–141) speaks of "the tendency of the tradition to redefine 'liberation by wisdom' (*paññāvimutti*) as being liberated by insight alone without high meditative attainments." This applies to both Theravāda and other Buddhist traditions. Note that the distinction between those who emphasized insight (*darśana*) and those who preferred cultivation (*bhāvanā*) is still present in more recent forms of Buddhism; see Buswell & Gimello 1992: 13–17 and Cox 1992.

36 See Bronkhorst 2019.

37 Cox 1992: 90.

38 I find, for example, nothing that might corresponds to memory reconsolidation in Schlingloff 1964/2006 ("Yogalehrbuch") or Pozdnejev 1927.

39 The *Maitri* or *Maitrāyaṇīya Upaniṣad* (6.18), for example, enumerates what it calls the six limbs (*aṅga*) of Yoga: restraint of the breath (*prāṇāyāma*), withdrawal of the senses (*pratyāhāra*), medita-

will bring about a mental transformation. A few passages in the *Pātañjalayogaśāstra* (= *Yogasūtra* + *Yogabhāṣya*) constitute an interesting exception.[40] The first of these deals with mental traces (*saṃskāra*) that oppose and overcome, with the help of absorption, other mental traces. The opposing mental traces are linked with the state of absorption (*samādhi*), the ones that are overcome with everyday wakefulness (*vyutthāna*). The passage reads:

> When the yogin has attained the insight connected with absorption, the mental trace (*saṃskāra*) of that insight comes about anew and anew. **The mental trace born from that [insight] impedes other mental traces** (*sūtra* 1.50).
>
> The mental trace that arises from the insight connected with absorption obstructs the stock of mental traces that has arisen out of the insight connected with everyday wakefulness. Since the mental traces connected with everyday wakefulness have now been overcome, no mental contents arise from those any longer. Once those mental contents have been suppressed, absorption comes about, followed by the insight connected with absorption, and then the mental traces produced by that insight. In this way the stock of mental traces increases again and again, followed by insight, then mental traces.[41]

Part of this passage reminds us of memory reconsolidation: mental traces (the ones arising from the insight connected with absorption) obstruct mental traces connected with everyday wakefulness. Replacement of some, or even all, "ordinary" mental traces with mental traces related to some better insight is precisely what we would expect successful memory reconsolidation to achieve.

There is no need to consider the details of what then follows, which takes us away from memory reconsolidation. The process culminates in the dissolution of the mind along with the mental traces connected with isolation, at which point the soul (*puruṣa*) is freed.[42] The

tion (*dhyāna*), fixation of thought (*dhāraṇā*), contemplation (*tarka*), and absorption (*samādhi*). It does not tell us what one does in those states.

40 It is well-known that the *Yogaśāstra* has undergone Buddhist influence; see Senart 1900; La Vallée Poussin 1937; Bronkhorst 1986: § 6.3; Wujastyk 2018; Gokhale 2020; O'Brien-Kop 2022. Indeed, O'Brien-Kop (2022: 19, 113ff.) criticizes a too rigid distinction between Buddhism and "classical yoga" and argues for "integrating the findings of contemporary scholars in Buddhist studies within current research in 'classical yoga' scholarship."

41 Maas 2006: 83–87; on *sūtra*s 1.50–51: *samādhiprajñāpratilambhe yoginaḥ prajñākṛtaḥ saṃskāro navo navo jāyate* | ***tajjaḥ saṃskāro 'nyasaṃskārapratibandhī*** (1.50) | *samādhiprajñāprabhavaḥ saṃskāro vyutthānaprajñāprabhavaṃ saṃskārāśayaṃ bādhate* | *vyutthānasaṃskārābhibhavāt tatprabhavāḥ pratyayā na bhavanti* | *pratyayanirodhe samādhir upatiṣṭhate* | *tataḥ samādhijā prajñā tataḥ prajñākṛtāḥ saṃskārā iti navo navaḥ saṃskārāśayo vardhate* | *tataś ca prajñā tataś ca saṃskārā iti* |.

42 On *sūtra* 1.51 (ed. Maas, p. 86–87): … *saha kaivalyabhāgīyaiḥ saṃskāraiś cittaṃ nivartate, tasmin nivṛtte puruṣaḥ svarūpapratiṣṭhaḥ śuddhaḥ kevalo mukta ity ucyata iti*.

sūtra under which this is described (1.51) speaks of seedless absorption (*nirbīja samādhi*).[43] Given that the *Yogaśāstra* states toward its end in so many words that a person can be freed while still alive,[44] we may assume that this state of absorption is thought of as the state of freedom, in agreement with the particular philosophy (Sāṃkhya) that underlies this text.

Mental traces (*saṃskāra*) are different from afflictions (*kleśa*).[45] In spite of that, they are suppressed in parallel fashion, with similar consequences. Indeed, *sūtra* 4.28 states that the abandonment of the mental traces is like the abandonment of the afflictions and has been described in connection with the latter.[46] More interesting is the claim (made under *Yogasūtra* 2.4) that, if the seeds of someone's afflictions have been burned, those afflictions will not be awakened even if they are confronted with that on which they rest. This, of course, is exactly what happens in the case of erasure. The passage further claims that the skilled person whose afflictions have been destroyed lives in his final body. That is, he will not be reborn and is freed.[47]

There is one further passage that deserves our attention. It is *sūtra* 3.18 and its *bhāṣya*. The *sūtra* states: "As a result of perceiving the mental traces, there is knowledge of earlier lives."[48] The *bhāṣya* explains: "Mental concentration (*saṃyama*)[49] on those [mental traces] is capable of perceiving the mental traces. And they cannot be perceived without experiencing place, time, and cause."[50] It is tempting to understand this, not in terms of previous lives, but in

43 In and under *sūtra* 1.18 it is stated that mental traces remain (*saṃskāraśeṣa*) in the absorption called *asaṃprajñāta* or *nirbīja*.

44 *Bhāṣya* on *sūtra* 4.30: *kleśakarmanivṛttau jīvann eva vidvān vimukto bhavati* (p. 202f.) "When his *kleśa*s and karma have ceased to exist, the wise is freed while still alive." Mallinson & Singleton (2016: 399) comment: "In the *Pātañjalayogaśāstra* the commentary to 4.30 notes with regard to the 'Cloud of Virtue' *samādhi* that the wise man is liberated while living … However, the continued presence of the *jīvanmukta*'s body in the liberated state is philosophically problematic on account of the two stages of *samādhi* (with and without cognition …), and because the modifications must be entirely abolished before the highest wisdom manifests – facts which did not escape the text's commentators, and which ultimately made living liberation an unsustainable notion within Pātañjala yoga."

45 There are five afflications (*kleśa*): *avidyā* "ignorance", *asmitā* "egotism", *rāga* "desire", *dveṣa* "aversion", and *abhiniveśa* "tenacity of mundane existence" (*Yogasūtra* 2.3).

46 In and on *sūtra*s 2.10–12.

47 On *sūtra* 2.4: *dagdhakleśabījasya saṃmukhībhūte 'py ālambane nāsau* [*i.e., prabodhaḥ*] *punar asti* | … *ataḥ kṣīṇakleśaḥ kuśalaś caramadeha ity ucyate* | (p. 60). On the meaning of *kuśala* ("skilled person"), see Maas 2014: § 4.1.5.

48 *Sūtra* 3.18: *saṃskārasākṣātkaraṇāt pūrvajātijñānam*.

49 Mental concentration (*saṃyama*) comprises holding (*dhāraṇā*), meditation (*dhyāna*) and absorption (*samādhi*). *Sūtra* 3.4 with *bhāṣya*: *trayam ekatra saṃyamaḥ* (3.4) | *tad etad dhāraṇādhyānasamādhitrayam ekatra saṃyamaḥ* | (p. 120).

50 On *sūtra* 3.18: *teṣu saṃyamaḥ saṃskārasākṣātkriyāyai samarthaḥ* | *na ca deśakālanimittānubhavair vinā teṣām asti sākṣātkaraṇam* | (p. 144f.).

terms of earlier experiences in this life that produce the mental traces concerned.[51] We know that getting access to them is crucial for memory reconsolidation. We also know that access to them can be difficult, and we have suggested that mental concentration – absorption especially – can provide access to those memories. This passage appears to be saying just that.[52]

I have not so far come across passages in other Indian religious texts that can easily be interpreted in the light of memory reconsolidation. They may exist, and I look forward to the findings of others in this respect. But care is required. One should not too easily interpret difficult passages in this manner. Memory reconsolidation is a recent discovery in modern psychology, and it is far from evident that this phenomenon was widely known in ancient India. There is the following Dutch saying: *Hij heeft de klok horen luiden maar weet niet waar de klepel hangt* ("He has heard the bell ring but does not know where the clapper hangs"). It is used with respect to people who know something by hearsay that they are clueless about. The passages of the *Yogaśāstra* discussed in the foregoing leave the impression that this saying may be applicable here. This would hardly be surprising. It has been shown that the person who brought *Yogasūtra*s and *Yogabhāṣya* together (presumably someone called Patañjali) did not always interpret the *sūtra*s as they were originally intended and what is more, he may not himself have had any direct experience of yogic states.[53] The most we can conclude from the *Yogaśāstra* passages analysed above is that practices involving reconsolidation were known in certain yogic circles. They make their appearance in these passages but have been adjusted to the theoretical requirements of the person we call Patañjali.

Desire: Some concluding thoughts

I wish to conclude with a few words about desire. The central role of desire in Buddhism as an obstacle to freedom can be understood in the light of another recent development in modern psychology: the distinction between "wanting" and "liking." Buddhist desire ("thirst") is most plausibly interpreted as corresponding to "wanting." Berridge and Robinson describe the difference between "wanting" and "liking" as follows:

51 According to at least one theory of memory formation and retrieval, "retrieving a memory can facilitate reinstatement of the context bound to the content of that memory, giving rise to a sense of mental time travel" (Nadel & Sederberg 2022: 17, with a reference to Tulving 1985). Compare also: "Our bodies are the texts that carry the memories and therefore remembering is not less than reincarnation." (Katie Cannon as quoted in Van der Kolk 2014: 221). See already Eliade 1958: 185, n. 61: "The reader will certainly have noted the correspondence between the yogic technique for recollecting former lives and the psychoanalytical method of reconstituting and, through a corrected understanding, assimilating one's memories of earliest childhood."

52 The early Buddhist texts, too, mention knowledge of earlier lives, for example in the *Bhayabheravasutta* (*Majjhimanikāya* no. 4). Perhaps this can be interpreted similarly.

53 Bronkhorst 1984.

> Rewards are both "liked" and "wanted," and those two words seem almost interchangeable. However, the brain circuitry that mediates the psychological process of "wanting" a particular reward is dissociable from circuitry that mediates the degree to which it is "liked." Incentive salience or "wanting," a form of motivation, is generated by large and robust neural systems that include mesolimbic dopamine. By comparison, "liking," or the actual pleasurable impact of reward consumption, is mediated by smaller and fragile neural systems, and is not dependent on dopamine. The incentive-sensitization theory posits the essence of drug addiction to be excessive amplification specifically of psychological "wanting," especially triggered by cues, without necessarily an amplification of "liking." This is due to long-lasting changes in dopamine-related motivation systems of susceptible individuals, called neural sensitization. A quarter-century after its proposal, evidence has continued to grow in support of the incentive-sensitization theory. Further, its scope is now expanding to include diverse behavioral addictions and other psychopathologies.[54]

Addictions – whether to substances or to behaviors (such as gambling) – illustrate the most noticeable and most extreme forms of wanting. But wanting is not limited to addicts. It is, as a matter of fact, impossible to draw a hard- and fast-line separating habit and addiction. To quote Marc Lewis:

> … addiction develops – it's learned – but it's learned more deeply and often more quickly than most other habits, due to a narrowing tunnel of attention and attraction. A close look at the brain highlights the role of desire in this process. The neural circuitry of desire governs anticipation, focused attention, and behaviour. So the most attractive goals will be pursued repeatedly, while other goals lose their appeal, and that *repetition* (rather than the drugs, booze, or gambling) will change the brain's wiring. As with other developing habits, this process is grounded in a neurochemical feedback loop that's present in all normal brains. … Addiction is unquestionably destructive, yet it is also uncannily normal: an inevitable feature of the basic human design.[55]

We are at present not interested in addiction in its more extreme forms, but rather in the neurochemical feedback loops that are present in all normal brains. Or perhaps better, given the highly impressionable nature of young children, we can say that we are interested in the "mini-addictions" they create and which together account to a large extent for the personality

54 Berridge & Robinson 2016: 670.
55 Lewis 2015: 7–9.

they acquire when growing up.[56] Seen this way, the following observations about addiction are equally useful for understanding "normal" human behavior:

> Like other developmental outcomes, addiction isn't easy to reverse, because it rides on the restructuring of the brain. Like other developmental outcomes, it arises from neural plasticity, but its net effect is a reduction of further plasticity, at least for a while. Addiction is a habit, which, like many other habits, gets entrenched ….[57]

Habits can start with desire or attraction, but also anxiety and other negative emotions can cultivate new habits. And once entrenched, habits can be difficult to extinguish. They are then embodied forms of "wanting." We may assume that, once the webs of entrenched habit have been disentangled and their emotional dimension neutralized by means of memory reconsolidation, "wanting" disappears.

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56 Lewis (2015: 53f.) speaks of the creation of a breeding ground of personal habits: "And one way to capture the combination of those habits is with the word 'personality'." To the "mini-addictions" we must no doubt add mini- (or not so mini-) traumas as elements that contribute to the formation of the personality.

57 *Ibid.* Entrenchment plays a role in psychopathologies: "We propose that many, if not most, psychopathologies develop via the gradual (or rapid – in the case of acute trauma) entrenchment of pathologic thoughts and behaviors, plus aberrant beliefs held at a high level, e.g., in the form of negative self-perception and/or fearful, pessimistic, and sometimes paranoid outlooks" (Carhart-Harris & Friston 2019: 321).

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