CHAPTER EIGHT

"It's only a dream": physiological and developmental contributions to the feeling of reality

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In his story, "The Night Face Up", Julio Cortazar describes a young man who finds himself in a hospital after a motorcycle accident. The protagonist's day, ordinary until he is surprised by a careless pedestrian, is transformed as he moves in and out of a dream while he lies in traction. In the dream, he is a Motecan Indian fleeing Aztec hunters trying to capture him for a mass sacrifice. Elements of the hospital are incorporated into the dream as he struggles against a rising fever: the surgeon's knife transformed into the priest's sharp stone, the odours of the operating room now interpreted as the smell of woods, swamp, and death. For most of the story, the protagonist is sure that he is the man injured in the hospital, but at the last minute, as he lies on an altar awaiting the cut of the priest's obsidian knife, "He knew that he was not going to wake up, that he was awake, that the marvelous dream had been the other, absurd as all dreams are—a dream in which he was going through the strange avenues of an astonishing city, with green and red lights that burned without fire or smoke … In the infinite lie of the dream, they had also picked him up off the ground, someone had approached him also with a knife in his hand, approached him who was lying face up, face up with his eyes closed between the bonfires on the steps" (Cortazar, 1968).

Like Cortazar, Freud (1900) makes the question of the dream's reality central to his exploration as he introduces chapter VII of *The Interpretation of Dreams* with the "Father, don't you see I'm burning?" dream, a dream that in his own words "raises no problem of interpretation and the meaning of which is obvious, but which, as we can see, nevertheless retains the essential characteristics that differentiate dreams so strikingly from waking life and consequently call for explanation (p. 510)". The dream serves as his point of departure into an examination of the "structure of the apparatus of the mind" and "the play of forces operating in it" (p. 511), leaving behind the complex grammar and syntax of dreams to develop a more abstract model seeking to explain "… the most striking psychological characteristic of the process of dreaming: a thought, and as a rule a thought of something that is wished, is objectified in the dream, is represented as a scene, or as it seems to us, is experienced (p. 534)".

In this paper, we present the results of our own research on the vicissitudes of the reflective self representation in dreams, that is, the awareness of oneself as the thinker or dreamer, in order to flesh out (so to speak) the relationship between REM sleep physiology, endogenous stimulation, and conscious experience. In doing so, we will try to present evidence for a model of the development of self reflection that takes into account the bidirectional relationship of the physiological patterning of REM sleep and maternal sensitivity within the development of the attachment relationship, and touch briefly on the multiple forces that contribute to the nightmare in the context of the analytic situation itself conceptualised as a variant of the dream (Ferro, 2002). Current theories of dreaming will be briefly reviewed in order to "place" our interest in self representation within the historical context of sleep research (see Nir & Tononi, 2010 for a more extensive review).

To return momentarily to Freud's quote, two questions are conflated: first, what is the nature of the internal stimulation that gives rise to this phenomenological experience of reality; how is it generated and modulated? And second, how does meaning come to be attached to these scenes that connects to the waking personality? Although Freud was careful to note that his model spoke only of psychical and not physical locality that could be tied to any "anatomical preparation", as Pribram and Gill (1976) and Schore (1997) among others observe, Freud's model in chapter VII can only be understood in conjunction with his then unpublished neurological treatise, "The Project for a Scientific

Psychology". Current sleep researchers continue to struggle with the same dichotomy that Freud's formulation alludes to, and in fact, the field has become increasingly bifurcated, much in the same way that controversies over the relevance of neurophysiology have divided the analytic world, with Green (Green & Stern, 2000) and more recently Blass and Carmelli (2007) arguing that the "objective" data of neurobiology have little to offer the clinical analytic process, which has its own methodology for the collection of information about the functioning of the mind.

On one hand, there is a burgeoning literature on the physiology, neuroanatomy, and neurobiology of sleep, "bottom up" theories that ignore the complex symbolic processes in dreams, and making a distinction between the formal properties of dreams (their hallucinatory perceptions, delusional beliefs, bizarre cognition, memory loss, and confabulation) and the meaning of any individual dream content. This is not to say that REM sleep physiology does not have a psychological function in some of these models, such as the consolidation of memory traces in long-term memory or the provision of a virtual reality model as the brain prepares for integrative functions such as learning (Hobson, 2009), but rather that these theorists deny that the particular content of a dream has any adaptive function. Surprisingly, the interrelationship between cognition and physiology in sleep has inspired researchers both in favour of psychoanalysis, for example Solms (1997), who uses evidence of NREM dreaming to support the relative independence of dreaming from any underlying state, and those opposed, for example Crick and Mitchison (1983) or Hobson (1998) and Hobson, Pace-Schott, and Stockgold (2000), for whom the dream is a by-product of the neurophysiological processes in the brain during REM sleep, an attempt at forebrain synthesis of the random limbic activation generated by REM.

Over the last decade neuroimaging of REM sleep has sought to provide an explanation of dream characteristics (Dang-Vu et al., 2010), offering a picture of regional cerebral activity during REM sleep—activation of the pons, the thalamus, temporo-occipital and limbic/paralimbic areas (including the amygdala), along with a relative quiescence of dorsolateral prefrontal and inferior parietal cortices. Thus amygdala activation is seen as consistent with the predominance anxiety and fear in reported dreams. Temporo-occipital activation is in keeping with the prevalence of visual stimuli, and prefrontal deactivation explains the cognitive impairments in dreams—the lack of temporal and spatial orientation, problems with working memory, and the acceptance of bizarre occurrences.

A variety of models have sought to explain the elusive relationship between the physiology of REM sleep and its accompanying mentation, all based on a premise that physiological phenomena could be directly translated into mental events either with a one-to-one correspondence (i.e., Roffwarg, Muzio & Dement, 1966) or that the intensity of psychological activation would be isomorphic with physiological activation at least to the operation of rank ordering, the premise behind Hobson's activation-synthesis hypothesis (Hobson & McCarley, 1977) as well as his later activation-input-modulation (AIM) model. None of these models included an assessment of individual differences in the way that activation was processed or cognised.

An increasingly separate literature, typified by the work of cognitivists, among them Domhoff (2002, 2005a, b), Foulkes (1985), Hall and Van de Castle (1966), and Hartmann (2008, 2010), strive to interpret the dream through the lens of its own symbolic language. They tend to stress the relative ordinariness of many dreams, seeing them as "top down" processes that begin in abstract thought and are processed back into imaginal, perceptual representations, and they explain the seeming bizarreness of dreams through the lens of waking linguistic processes such as metaphor, conceptual blending, and irony. Content analytic studies support the continuity between dreams and waking life, through the kind of interpenetration of themes and images seen in the Cortazar story as well as the same "everyday" problems expressed in both states (Foulkes, 1985), with emotions appropriate to their content (Foulkes, 1999), structured by the feelings and activities of the waking individual (Domhoff, 2002; Hall & Van de Castle, 1966) and manifesting considerable topic consistency over time (Bulkeley & Domhoff, 2010). REM sleep is not taken as a model for dreaming, as similar mentation to REM can be found at sleep onset or occasionally, during NREM sleep. In these models, dreaming is not seen to have any function; borrowing from ideas of Stephen Gould, Flanagan (2000) terms dreams "spandrels", likening them to the mosaic decorations that accompany the arches on fan vaulted ceilings, which in themselves have no structural purpose, but are by-products of another adaptive need and have simply been carried along. Thus, the meaning of the dream is not inherent in its original construction, but is made, like any other fantasy, when integrated with the waking life.

While it seems intuitively obvious that the work of the cognitivists, who share with Freud a "top down" approach to understanding the dream, would be closer to the analytic perspective, in fact this is not the case. The cognitivists emphasise that dreams, while they do express individual ways of abstracting knowledge from experience, do not refer to actual episodes in one's life, nor are they directly related to a memory of previously lived experience, as analysts would claim for the day residue. There is no distinction made between latent and manifest content, no examination of associated mentation, or any discussion of defence or condensation. A typical methodology involves word counts of characters, social interactions, emotions, settings, and descriptive modifiers, providing the advantage of good inter-rater reliability, but rarely touching on the complexity of the way dreams are understood in analysis, both as synthesis of past material and a reflection of current transferential concerns. Here, surprisingly, we find ourselves in agreement with Hobson (2005), who commented that while he did agree with Domhoff's conclusions about the personality of a dream journal's author, he "hardly needed to analyze his dreams to reach that conclusion [that the owner was shy, meticulous, and constricted]", but that he could have ascertained that from the dreamer's introduction to the journal. Instead, as Ellman (2009) has noted, the psychophysiological studies of dreams, at least potentially, provide a bridge between Freud's quantitative notions of drive and the effects of endogenous stimulation on mentation.

The suspension of reflective self representation in dreams

Our choice of which aspect of sleep mentation to study was influenced primarily by psychoanalytic contributions on the nature of dreaming. In addition to Freud (1900), both Rapaport (1951) and Schafer (1968) had focused on the diminished capacity to test reality in dreams, a state comparable in some regards to infancy, when the ability to distinguish what is internally generated from what is external is limited. The development of the ability to make this distinction is tied to the development of reflective awareness, the awareness of oneself as the thinker of a thought, which is one aspect, certainly a later stage in the development of self/object differentiation. During waking, this awareness exists along a continuum—nearly absent in states of sexual pleasure or intense physical exertion and heightened in states of anxiety that generate painful self awareness; the reversible suspension of reflective self representation was thought to be an aspect of what lent intense transference states their mutative power. We reasoned that this awareness ebbs and flows during sleep as well, with the difference that during sleep, due to the relative isolation from external sensory input and motor inhibition, it would vary primarily with the intensity of endogenous stimulation.

REM sleep is a convergence of both tonic processes, that go on continuously throughout the REM period, such as an aroused EEG and suppressed muscle tone, and those that are episodic or phasic, such as eye movements, middle ear muscle contractions, and the hypersuppression of muscle tone. We had postulated that episodes of phasic activity provided the most intense endogenous stimulation. In confirmation of this hypothesis, recent functional magnetic resonance imaging (fMRI) evidence shows phasic and tonic REM periods to have different functional substrates (Wehrle et al., 2007), characterised an almost complete lack of cortical responsivity to external auditory stimuli during REM phasic, but not REM tonic episodes, leading the authors to postulate a closed loop thalamocortical network including limbic and parahippocampal areas specifically active during phasic REM periods. Another way of stating our hypothesis was that phasic activity would decrease the presence of reflective awareness and increase the likelihood that the dream would be experienced as real and compelling. REM sleep, and particularly phasic episodes within REM sleep were seen as periods of high endogenous stimulation and hence a suspension of reflective awareness would be most likely during REM phasic episodes, less likely during REM tonic episodes, and least likely during NREM sleep.

However, while phasic and tonic processes can be dissociated, there was only equivocal evidence that the mentation from tonic and phasic episodes of REM sleep were qualitatively different. Previous studies had examined such variables as the presence of visual or auditory imagery, bizarreness, emotional quality, or recall. Pivik (1991), in summarising this data, suggested that attempting to match discrete physiological measures with specific aspects of mentation required an impossible degree of introspection from subjects and had reached a point of diminishing returns, but allowed that there might be a qualitative aspect of dream phenomenology which might still be a correlate of phasic activity.

Our results, in two carefully controlled studies, provided evidence that the primary psychological correlate of phasic REM activity was the experience of the dream as real, and that as a consequence the dreamer reports mentation in a manner that communicates his or her immersion in the event (Weinstein, Schwartz & Ellman, 1988, 1991). The scales that we had developed to target immersion in the dream experience were more successful at making the discrimination between phasic and tonic activity, than previous scales which tapped into related, partly correlated aspects such as "dreamlikeness" and primary visual experience. In fact, our most sensitive scale involved no conscious reflection on the part of the subject. It did not discriminate REM from NREM sleep, but was the best discriminator of REM phasic versus REM tonic awakenings. Based purely on the spontaneous dream report in response to the question, "What was going through your mind before you were awakened?", the report was scored for the presence of absence of a grammatical form of self reflection, i.e., "I was dreaming that I was driving a car" versus a statement such as "I was driving." Thus, how a concept is measured and the amount of introspection the subject is asked to engage in may alter the results, such that asking the subject to reflect on their experience may lessen their reported experience of involvement (Kahan, 1994).

What we had not predicted was that there would be powerful individual differences. During baseline nights, subjects who tended to respond in a socially desirable manner on a waking self report personality measure, thus making themselves appear more "normal" to an observer, were the least likely to show a differentiation between phasic and tonic REM reports. During the time when we would expect subjects to be most immersed, they paradoxically reported that the dream did not feel at all real. Subjects who were least influenced by demand characteristics were more likely to show a differentiation between phasic and tonic REM reports.

A second study looked at responses to REM deprivation. On recovery nights following REM deprivation, an increase occurs in the absolute amount of phasic activity in REM sleep; hence one would expect subjects to report that they were very immersed in the dream at that time. However, those subjects who did not discriminate phasic from tonic episodes from REM sleep on baseline, had less absorbing mentation from REM phasic episodes during recovery nights. In other words, this subgroup of subjects paradoxically showed an increase in reflective awareness and invoked the disclaimer, "I was only observing; I knew it was just a dream."

For some, but not all subjects, higher levels of endogenous stimulation caused them to defensively (or perhaps adaptively, viewed from another angle) insist that the dream was simply a thought. Schaefer (1968) conceptualised the suspension of reflective awareness as one form of loss of self-object differentiation, which can be pleasurable or, depending on both context and the individual, as frightening. In so far as the dream expresses desires that the dreamer may find disturbing, experiencing the dream as real could be threatening, and the experience had to be warded off by those who were less tolerant of anxiety producing thoughts during waking. Looking at the level of endogenous stimulation in conjunction with defensive style allowed us to make predictions about an individual's dream experience, apart from any specifics of the dream's content.

Recent studies of the experience of the self in different sleep states are not directly comparable to ours, in part because self awareness is a multi-varied concept (reviewed in Kozmova & Wolman, 2006) and the measures used to evaluate self awareness tap into different aspects of that trait. McNamara, McLaren, and Durso (2007) attempted to characterise the representation of the self in REM and NREM dreams, but made no distinctions between phasic and tonic events within REM sleep, did not consider individual differences, and measured the self using self concept related dream content indexes such as bodily misfortunes, dreamer-involved success, and the nature of social interactions which were derived from the Hall/Van de Castle dream content scoring system. Further, they compared REM and NREM dream reports equated for length, lowering any probability of being able to find distinctions between the two sets of reports, as they essentially chose the least "REM-like" REM reports. They did, however, note that the dream self was significantly more often an aggressor in REM sleep as opposed to NREM sleep, a finding which would be in agreement with earlier findings by Pivik (1971) and Watson (1972), who noted that phasic arousals from REM sleep contained significantly more hostility. Occhionero, Natale, Esposito, Bosinelli, and Cicogna (2000) found significant differences between REM and Slow Wave Sleep in self representation, with self hallucinations more often reality-like during REM, and Fosse, Stickgold, and Hobson (2001), using a definition of hallucination similar to the suspension of reflective self representation, found a clear increase in this state from sleep onset through NREM sleep and reaching a peak in REM sleep.

Our results provided clear evidence of the effect of endogenous stimulation on mentation, but in addition, that other factors, such as defence, or the tolerance for an altered state of the self, also determined how the dream would ultimately be experienced and reported. In sum, we reasoned that the tolerance for various kinds of mentation was a function both of the level of endogenous stimulation, which we assumed to be a normally distributed trait among the population, and a person's developmental experiences, which altered the thresholds for what they might experience as pleasurable or unpleasurable.

Although the level of endogenous stimulation in REM sleep continued to have an effect in adulthood, we wondered what developmental experiences might influence the individual differences we found. One obvious candidate would be the attachment relationship, particularly given the large body of research tying attachment to the development of reflective function (Fonagy & Target, 2002).

REM sleep in infancy: endogenous contributions to the organisation of attachment behaviours and the development of the reflective self representation

Based on the selectively activated neuroanatomical structures and neurochemical processes during REM sleep, McNamara and his colleagues (McNamara, Andresen, Clark, Zborowski & Duffy, 2001; McNamara, Belsky & Fearon, 2003; McNamara, Dowdall & Auerbach, 2002; Zborowski & McNamara, 1998) reasoned that REM sleep is necessary to promote and maintain biological attachment processes and aids in the development of reproductive strategies. They noted a partial overlap between the anatomy of attachment and that of REM sleep, following Steklis and Kling's (1985) finding that the limbic system sites, particularly the amygdala, central to the regulation of homeostasis and emotional behaviours, as well as the anterior temporal cortex and the orbital frontal cortex, were critical for attachment, and limbic and cingulated frontal regions also evidenced the high activation during REM sleep. Furthermore, REM sleep was associated with the release of oxytocin, a hormone centrally implicated in attachment (Insel, 1997), with oxytocin peaks occurring at 4 o'clock in the morning when REM sleep starts to predominate over NREM sleep. Attachment (McNamara, Dowdall & Auerbach, 2002) was actually thought to occur during sleep and nursing periods when the infant elicits nutritional and thermal resources from the mother, and when the entrainment of physiologic and behavioural rhythms through "heat transfer, touch, grooming, suckling in the infant, milk ejection in the mother … active sleep/REM activation in the infant, arousal overlaps, hormonal rhythm overlaps, temperature cycle entrainment …" can take place. Additionally, REM sleep was seen to activate behaviour such as cooing, crying, smiling, and sucking that would elicit caring from the mother.

The selective increase in paradoxical sleep after laboratory imprinting sessions (Solodkin, Cardona & Corsi-Cabrera, 1985), as well as the negative effect on sexual function in several mammalian species of early deprivation of REM sleep (Kraemer, 1992; Mirmiran et al., 1983; Kraemer, 1992), further supported the role of REM sleep in attachment. More recent research suggests a bidirectional influence with changes specific to REM sleep in response to stress of both male and female rats which underwent maternal separation (Tiba, Palma, Tufik & Suchecki, 2003; Tiba, Tufik & Suchecki, 2004, 2007), the hypothesised mechanism being that maternal separation induced a hyper-reactive hypothalamic-pituitary adrenal axis which led to a stress reduced impairment in sleep architecture.

Several studies document a relationship between sleep disorders in later childhood and insecure maternal attachment (see Benoit, Zeanah, Bucher & Minde, 1992 for a review of early studies). Later work by Anders (1994), Mahoney (2009), McNamara, Belsky, and Fearon (2003), and Scher (2008), found in a large sample study that insecure resistant attachments had a significantly greater number of night awakenings of longer durations than their insecure avoidant counterparts.

Zyborowski and McNamara (1998) spell out the causal relationships in their model as follows: a biological clock periodically activates REM processes that go on both in sleep and during the day (Kripke & Sonnenschein, 1978); REM then activates limbic and oxytocinergic brain systems that support attachment, which builds both through attunement of the biological rhythms of the two people in the dyad while sleeping and also through dreaming, which supports the internalisation of the mnemonic images of the object which guide waking search strategies. Through this developing entrainment, the mother can regulate the infant's biological processes, while dreaming contributes to the construction of an internal cognitive working model, an adaptive remembering of the complex of events and objects that have been soothing in the past.

This model is in some respects similar to the one we propose, stressing the entry into a symbiotic attachment as a necessary precursor to further individuation processes (Mahler, Pine & Bergmann, 1975), the midwife of which is the mother's synchronous attunement to her infant's communications. However, we were further interested in the mechanisms through which subjectivity and the reflective self developed, particularly in evidence for the endogenous contributions to this bidirectional adaptation, as our adult studies demonstrated that the capacity to retain reflective function varies both with physiological parameters and with individual differences. Let us say at the outset that the developmental studies which would offer definitive proof of the model we are presenting have yet to be undertaken, and the evidence is, at best, correlational, but we present it as it offers a rationale for a clinical stance and supports some of our research on repetition in the analytic situation and its relationship to ruptures in the transference.

Studies of sleep in infancy noted wide individual variations in the early development of the sleep cycle (Burnham, Goodlin-Jones, Gaylor & Anders, (2002)). In addition to the well documented higher percentage of REM sleep in infancy (mean Active Sleep (AS) per cent was 66.2 Standard Deviation of nine), there was considerable inter-individual variability from night to night and at each age when measured at monthly intervals during the first year of life. At one month AS ranged from a low of 41 per cent to 92.5 per cent. By twelve months the mean was 41 per cent with a range of 20 per cent (approximately the adult percentage) to a high of 68.5 per cent. Burnham and colleagues used videosomnography so the architecture and cohesion of REM sleep at the different ages could not be measured. However, earlier studies (Emde & Metcalf, 1968; Roffwarg, Muzio & Dement, 1966) noted the presence of undifferentiated REM states, segments of sleep which are poorly organised during periods when the infant is fussing, crying, drowsy, or sucking, as well as REM when sleeping. Neonatal REM thus showed an initial high variability of physiological patterning (Anders & Weinstein, 1972; Dittrichova, 1966; Emde & Walker, 1976; Hoppenbrouwers, Hodgman, Arakawa, Giedel & Sterman, 1988; Parmelee, Wenner, Akiyama, Schulz & Stern, 1967; Petre-Quadens, 1966), with poorly organised states with mixed features which tended towards stability over the first three months, particularly a marked increase in quiet sleep over the first three months, considered as an important correlate of maturation of forebrain inhibitory centres and a decrease in ambiguous sleep over the first year (Ficca, Fagioli & Salzarulo, 2000). This change is concomitant with the finding that at three months sleep begins with NREM instead of REM sleep. In these studies as well, there were significant individual differences in the decline of indeterminate sleep. Providing further evidence that REM was not a unified state in early infancy, Anders and Roffwarg (1973) found that it was impossible to selectively deprive infants of REM sleep. Roffwarg's thesis was that the high percentage of REM sleep in infancy provided an endogenous source of stimulation which could provide excitation to higher centres, in the absence of exogenous stimulation, and that REM would decrease as the infant became more able to process exogenous stimulation.

Clinical studies of later pathology predicted from neonatal sleep records (Monod, Dreyfus-Brisac, Eliet-Flescher, Pajot & Plassart, 1967) found that the absence of the normal concordance between physiological measures, reflected as an increased proportion of indeterminate sleep, was the most common pathological finding. While the prediction of minor sequelae from EEG records was overall poor, the absence of cyclical activity in EEG patterns and persistent absence of occipital activity were prognostically unfavourable. More recently, Sheldon (2007) and Scher (2008) have reiterated that the clear development of "states" can reflect the functional maturation of the nervous system, with lags in state development potentially evident through both structural and developmental repercussions. At three months, both relational (parental response times to infant awakening) and sleep variables (level of quiet sleep) significantly predicted an infant's ability to self soothe at twelve months (Burnham, Goodlin-Jones, Gaylor & Anders, 2002).

The role of the attachment relationship in patterning the infant's nascent neurobiological organisation has been well documented and shall not be reviewed here (see Fonagy, Gergely, Jurist & Target, 2002; Fonagy, Gergely & Target, 2007; Hofer, 2006; Weinstein, 2007). We would suggest that at certain critical periods in the development of the attachment relationship, physiologic dysregulation enters as an independent variable in the long journey to recognise and represent the contents of one's own mind. The seemingly critical time for the organisation of the REM sleep period at around three months is also a central juncture in terms of the attachment relationship. Fonagy and his colleagues (Fonagy, Gergely, Jurist & Target, 2002; Fonagy, Gergely & Target, 2007;

Fonagy & Luyten, 2009; Gergely & Unoka, 2008) proposed that the infant discovers and becomes able to make second order representations of its own primary procedural affect states through early mirroring transactions with the caregiver that are both contingent (that is, reflective of the child's actual emotional state) and/or marked (that is, slightly exaggerated or transposed to another modality of expression so that the mother shows understanding of the affect while indicating she is not expressing her own feelings). Watson (1994) noted that a maturational switch in normal infants took place at around three months, so that the preferred target in the infant's contingency detection module changed from a formerly preferred perfectly contingent self image to a preference for non-contingency, or more specifically, a high but imperfect contingency. This maturational shift marks the infant's developing ability to turn towards "the exploration and representation of the social world" (Fonagy, Gergely, Jurist & Target, 2002), and away from the endogenous stimulation which occurs as part of REM sleep and which was critical to the development of sensory systems (Graven, 2006). Any dysregulation in the innate contingency detection mechanism that registers both relative intensity and the temporal and spatial relations between the infant's efferent motor responses and the consequent events will hamper the child's ability to differentiate stimulus events that are the outcome of their own motor responses from those that come from others. This basic dysregulation may contribute to a preference for repetitive and perfectly contingent motor activity at a point when normally developing children turn to the less-than-perfect contingencies represented in the social world (Bahrick & Watson, 1985; Gergely & Cibra, 2009), a finding noted in autistic children.

Children with these irregularities might require more exact repetitions in order to establish the critical image of the object, and may find their ability to establish this image more easily impaired, particularly if overstimulated or frightened by the external environment (Gergely, 2001; Gergely & Watson, 1999). We would suggest that the delayed development of clear REM states would interfere with attentional mechanisms that would allow the infant to recognise the "marked" facial expressions that help them ultimately define its own individuality. In addition, the infant's disorganisation might make it more difficult for the caregiver to correctly "read" the infant's state in order to correctly mirror it back to them. While the coalescing of REM processes might only be a delay, it could have longer-lasting consequences in terms of the development of attachment, as Koback, Cassidy, Lyons-Ruth & Ziv (2006) (cited in Fonagy, Gergely & Target, 2007) suggest: changes in attachment organisation decrease over time as mismatches may become harder to correct.

The subtlety of the necessary adjustment was highlighted by a recent study of maternal affective communication in a low risk sample at four months and infant attachment disorganisation at one year (Miller, 2010). The study found the quality of anomalous maternal behaviour at four months that best distinguished organised from disorganised dyads at one year was that mothers of disorganised infants were more apt to become aggressive with their infants and more likely to respond inconsistently to infant distress. However, in the two and a half minute taped interaction, even the mothers of infants that were later classified as disorganised were described as "often pleasant … with, at times, only brief moments of hostility, aggression or anomalous response to infant distress." Similarly, while these mothers were not judged as disrupted in their overall maternal affective communication, they displayed a marked difficulty tolerating their infant's distress or evidenced at least isolated markers of aggression or other egregious anomalous acts … including not responding to their infant's neutral/positive cues. One way of explaining these initially puzzling findings is that it is possible that, momentarily, these infants were harder to read.

In sum, we see first that the development of the attachment relationship and its contribution of the reflective self is an interaction of physiological and intersubjective factors, in infancy as well as adulthood. Second, the level of endogenous stimulation will always affect the ability to distinguish self from other, and internal from external.

Conclusion

In this somewhat roundabout exploration, we seem to have travelled far from the dream, so let us return momentarily to the nightmare that forms the basis of the Cortazar story, most likely autobiographical in nature. It should be obvious that we see the dream, at least partly, as a representation of bodily states underlying its construction, and partly as influenced by processes of attachment, which modify an individual's set points in their evaluation of affective experience, determining whether an experience is felt to be aversive or pleasurable, mediating anxiety, and altering the necessity for the mobilisation of defence throughout development. What then happens in the nightmare? If we see the function of REM sleep as supporting attachment, as "calling out" to the object in early development, then as representational structures develop, these processes will inform both the affective tone of the dream and the character/self interactions. Nielsen and Lara-Carrasco (2008) and Hartmann (1996, 1998), among others, have suggested an emotion regulation function for dreaming that is facilitated when an individual's affective concerns are contextualised within a dream by becoming attached to visual imagery which then incorporates new associations, making use of the more flexible memory systems active in REM sleep. Their explanation for nightmares includes a heightened activation of subjective and autonomic correlates of emotion under the control of the amygdala (a state variable), but also the contribution of a trait variable (affect distress) believed to be controlled by the anterior cingulate cortex and shaped by the emotional history of the individual. Thus the nightmare involves both heightened fear, and a failure of the object to regulate that fear. They suggest that this may be represented in the content of the dream in terms of increasingly malevolent character/self interactions. In the Cortazar story, the protagonist's objects are, at first, benevolent, offering something soothing to drink, but as his illness progresses, the nurses begin to make wisecracks, and the surgeon stands over him with something gleaming, and he can no longer reach the soothing bottle of water. Ultimately, the last hope of a frightened child, the mother's soothing statement "It's only a dream," is lost, and he can no longer pull himself out of the horrific experience.

Processes of attachment have been shaped by, and in turn regulate the ways in which endogenous stimulation is experienced, cognised, and symbolised. To return to our earlier summation of the current bifurcation of dream theory, the poles of physiology and meaning, it should be obvious that neither position can, by itself, express the complexity of the dream process. Perhaps this is why Freud gave up the Project, a realisation that while state could be predicted from neuronal firing, the wide variations in symbolic representation would never be tied with precision to physiology.

However, endogenous stimulation remains critical to our understanding of how the transference is experienced. The necessary "reality" of the transference is bound to the accrual of ungratified desires which light our vision of the transference object. Our central metaphors are likewise generated in the cauldron of the body, incorporating traces of the body's demands and rhythms, or what we have variously called drive or endogenous stimulation. Throughout development, experiences of our bodies are woven into ever more complex narratives shaped by the objects that populate our world. We can only attempt to ever more precisely articulate the interacting contributions of body, object, and history to the events in our real and fantasy lives and the dreams we report in the analytic situation.

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