THE EVOLUTION OF POST-TRAUMATIC BEHAVIOR: THREE HYPOTHESES

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ABSTRACT

Catastrophic stressors regularly lead to the often-disabling symptoms of the post-traumatic stress disorders (PTSD). With resulting impairment in both personal survival skills (heightened vulnerability, self-destructive behavior) and reproductive capacity (disturbed relationships, sexual dysfunction), PTSD symptoms should be strongly selected against by natural evolution. Their wide prevalence thus presents an anomaly for the evolving paradigms of evolutionary biology. Three hypotheses may help to resolve this anomaly: (1) The same psychodynamic features that are maladaptive in a rapidly changing milieu like today's technological societies (dissociation, blurred interpersonal boundaries, cognitive distortion, rigidification, and affect-driven behavior), may ensure personal survival and family bonding in a comparatively stable milieu where threats are catastrophic but infrequent and stereotyped; e.g., that within which homo sapiens probably evolved. (2) Spontaneous hypnotic dissociation often accompanies the experience of trauma, which may (a) promote immediate survival; (b) permit later growth and development, at cost of perpetuating some impairment; and (c) facilitate deception of others by deception of self. (3) Traumatic affect may provide a driving force for ongoing cultural evolution.

THE PROBLEM OF POST-TRAUMATIC IMPAIRMENT

"Psychological trauma" denotes a catastrophic stressor beyond the range of everyday experience, that would be "markedly distressing to almost anyone," and usually experienced with intense fear, terror, and helplessness (American Psychiatric Association, 1987, p. 247). It will profoundly impact the subsequent life course of any individual, and often lead to a characteristic syndrome known as Post-traumatic Stress Disorder (PTSD). PTSD is characterized by intrusive *re-experiencing* of the trauma, persistent *avoiding* of the trauma or *numbing* of responsiveness, and persisting symptoms of *increased arousal*. Other conditions often traced to catastrophic traumata include dissociative disorders like multiple personality disorder (MPD), personality disorders like the borderline (BPD), neurotic conditions like obsessive-compulsive and phobic, atypical psychoses, and many impulse control and substance abuse disorders. I will use the term PTSD in a broad sense, to encompass all of these related conditions.

Traumatized patients are blatantly impaired at two levels: both should be adversely selected against by the forces of natural evolution. First, personal survival is endangered by heightened vulnerability to minor stressors, reckless endangerment, and overt self-destructive actions like substance abuse and suicide. Second, reproductive capacity is impaired by difficulty sustaining the intimate relationships so essential for familial protection and child-rearing, often accompanied by sexual dysfunction. That these impairments so frequently follow psychological traumata, with most individuals having experienced such traumata during the vagaries of life itself, presents an anomaly for the evolving paradigms of evolutionary biology. In short, *How did the forms of post-traumatic impairment, that appear to be so intrinsically maladaptive, survive natural evolution?*

In developing three tentative hypotheses, I will first summarize the growing data base on the nature and forms of post-traumatic response. This leads to the first hypothesis, that such cardinal features as dissociation, blurred interpersonal boundaries, cognitive/perceptual distortions, rigidification, and affect-driven behavior are destructive only in a rapidly changing world – but might have proven exceptional assets in the dangerous but comparatively stable environment in which mankind probably evolved.

This will be followed by a closer look at a well established link between trauma and the poorly understood phenomena often called "hypnosis." This leads to the second hypothesis, that spontaneous hypnotic states often evoked by trauma may themselves be adaptive at several levels. They can promote immediate survival; permit growth and development, even at the cost of perpetuating a degree of impairment; and facilitate deception of others via self deception,

supporting the evolutionary hypotheses of Trivers (1985), Alexander (1987) and Nesse (in press). The third hypothesis is that traumatic affect may provide a driving force for human evolution, an "evolutive impulse" so to speak (Beahrs, 1977), that may fuel creative innovation at social, technological and cultural levels. I will close with some speculation on how modern man might recapture and utilize some aspects of post-traumatic psychology that had once been adaptive in other milieus.

Hypothesis #1: Post-Traumatic Behavior Was Once Adaptive

The first hypothesis is that characteristic features of post-traumatic behavior are maladaptive only where the psychosocial environment is rapidly changing. In settings that remain stable over extended periods of time, with recurrent dangers being relatively infrequent and stereotyped, the same features instead confer powerful selective advantage for both survival and reproductive success. If the latter setting describes the environment within which mankind originally evolved, this should sufficiently explain how the nature of the post-traumatic response evolved to become what it is, even though now so often pathological. To better contrast its effects in these two settings, it is useful to re-categorize post-traumatic behavior within the psychodynamic dimension. Here, five common features are observed that occur and recur throughout the gamut of post-traumatic conditions.

First and foremost is *dissociation* — the creation of boundaries *within* one's psyche, so that one sector or *part* can operate with relative autonomy from others, sometimes to overall advantage but often with overt inner conflict, self-sabotage, or paralysis of action. Dissociation takes different forms of expression. Overt splitting in multiple personalities is now understood as a sequela of gross child abuse (Kluft, 1985). More subtle is the interpersonal splitting seen in borderline personalities, who alternately perceive significant others as "all good" or "all bad" instead of the more realistic blends of gray; these too may also have a traumatic origin (Herman & van der Kolk, 1987). In classic PTSD, dissociation manifests itself as episodic intrusions of the trauma (reliving, nightmares, flashbacks) coexisting with desperate attempts to keep it at bay. Many combat veterans describe "two personalities – one civilian, peace-loving; the other a 'war personality,' a ruthless killer." Caputo (1977, p. 280) vividly described the moment at which he had "become two."

Second, internal splitting is accompanied by a paradoxical *blurring of boundaries* in the interpersonal sphere, with confusion over who does what to and for whom, who is thinking and feeling what, and thus, who is responsible for what and at what level. Patients may simultaneously plead for help and yet sabotage it, and may develop a conflicted "regressive dependency" with increased risk of dangerous acting out (Beahrs, 1986, ch. 4). A closely related process is "projective identification," experiencing one's own feelings (usually negative) as if belonging to someone else, and then attempting to control in the other person what was never true of that person in the first place (Klein, 1946; Beahrs, 1986; Hamilton, 1988). This wreaks havoc with intimate relationships, and can also make psychotherapy difficult.

Third, *cognitive and perceptual distortions* can profoundly alter the experience of trauma, and events or relationships that subsequently become associated with it. Terr (1983) found that many traumatized children suffered a "time skew" in which later events were falsely "remembered" as if having happened before; over three quarters blamed themselves for not having heeded an "omen" that never occurred. The children seemed to prefer a false guilt to the utter helplessness that most combat veterans also report as the most aversive aspect of traumatic experience. Spiegel (1984) noted a further irony, that denying the helplessness of actual fact may lead one to later assume a victim role in other circumstances that are not appropriate.

The fourth feature is *rigidification* of personality, of one's enduring patterns of both thinking and acting, such that the other post-traumatic processes become entrenched and defy attempts at change almost as if it were a matter of survival. Terr's (1983) most pessimistic finding was the resistance to preventive psychotherapy of virtually all of her trauma victims.

Fifth and finally, is *trauma-driven behavior*. This has two components that, paradoxically, often work against one another and may contribute to persistence of the disorder. Foremost, avoidance of traumatic affect becomes an organizing force for the subsequent personality, creating a "false self" whose main function is to keep the traumatic affect at bay, often betraying one's true autonomous strivings in the process (Beahrs, 1986, ch. 5). At the same time, this is usually coupled with "re-enactment behavior" that episodically re-creates the trauma, and may also traumatize one's intimates, leading to transgenerational perpetuation—the destructive "repetition-compulsion" whose obstinate resistance to change led Freud (1920) to postulate a separate "death instinct." Most of Terr's (1983) traumatized children engaged in "postraumatic play" that sometimes increased in dangerousness, and even led to one boy's demise. The incongruity of avoidance and simultaneous reenactment is seen in most neurotic and personality disorders, and may have a definable biological mechanism. Van der Kolk and Greenberg (1987) find that some re-enactment behaviors are blocked by opiate antagonists, and postulate that patients become addicted to their own endorphins, secreted in excessive amounts during trauma.

These features of post-traumatic behavior are grossly maladaptive only in a rapidly-changing milieu that requires adaptive flexibility and tight interpersonal boundaries. Such environments did not become common, however, until almost the evolutionary present.

Hominization most likely occurred in the African savanna, and mankind spent approximately ninety-nine percent of its subsequent history in primitive settings prior to the advent of civilization (Eibl-Eibesfeldt, 1989, ch. 8). These settings certainly varied, which fostered selection for man's unique adaptive flexibility. For the most part, however, they probably remained stable for extended periods of time, even millenia. Where this was the case, we could expect catastrophic threats to have occurred regularly, but infrequently and in comparatively stereotyped form – e.g., predation, illness, natural disaster, and attack by competitive humans

with limited weaponry. Here survival and reproductive continuity would have depended heavily on (1) defensive skills that were highly practiced for specific situations, without need for their adaptation to unfamiliar circumstances, and (2) family bonding, with defense of common interests dominating those of the specific individuals. Let us now review the five psychodynamic features of PTSD within this type of milieu.

Dissociation, as now, permitted an internal division of labor into separate differentiated roles (Beahrs, 1982). When with family, a man could attend to his usual supportive roles relatively free from traumatic interference. When confronted with external danger, he would semi-automatically "switch" into a dissociated combat mode, employing the requisite skills to meet the threat, now free of interference from his usual roles. This is often problematic today, e.g., when a traumatized war veteran "plugs in" his combat role when his wife makes an outcry or a helicopter flies overhead. It is adaptive, however, the more that the nature of recurring threats are sufficiently stereotyped that dissociated responses to prior traumata will appropriately "fit" future ones.

Blurred interpersonal boundaries serve to merge the psychological interests of the respective parties. If his spouse or child is threatened, a man is more likely to defend them as himself, and this will increase the likelihood of perpetuating his genes. Similar forces probably bond a woman to sexual fidelity, and interdependence of material needs should cement the bonding at both levels. More constructs like male "honor" and female "fidelity" probably evolved early on to legitimize these role demands, with violation punishable by death or disgrace. Blurred boundaries become problematic only in a modern society, where rapidly changing role demands favor relative autonomy of individuals. They become adaptive, the more than objective interests are shared by the respective parties.

Cognitive and perceptual distortions, as noted by Terr (1983), are generally in a direction that mitigates the subjective sense of traumatic helplessness vis a vis the specific stressor, although they often displace it to other contexts (Spiegel, 1984). This would lead to subjective impairment when role demands are constantly changing, but should promote subjective confidence when future stressors are likely to be similar to past ones.

"Rigidity," a pejorative term in today's society, likewise becomes more adaptive in stable settings where common interests merge. Even today it can be reframed as "integrity" or "fidelity" (Beahrs, 1986, ch. 3), traits that may well be higher in some traumatized individuals.

Affect-driven behavior has several selective advantages, in both its polar aspects. Traumatic avoidance has the obvious potential to neutralize external threats by either fight or flight, adaptive as long as it fits the nature of the threat. Reenactment behavior is more subtle. If the recurrent threats are *stereotyped, but relatively infrequent*, then to episodically recreate the traumatic situation may stimulate enough ongoing rehearsal and practice, so that when a real emergency occurs, the needed skills are readily at hand. They are like learned instincts, then, stamped upon the organism's otherwise greater adaptive flexibility, to fit the particular type of dangerous but stable world in which he or she lives.

In summary, *these features of post-traumatic behavior are all adaptive to the degree that the nature of the expected threats is stereotyped, and that the interests of the respective parties are shared.*

Hypothesis #2: Peri-Traumatic Hypnosis Confers Specific Advantages

The second hypothesis is that even while characteristic patterns of post-traumatic behavior are induced and rigidified, a type of creative mental ability is also fostered that can confer selective advantages in addition to those just described. This falls under the rubric of spontaneous hypnosis, which is known to be increased during and after the experience of a catastrophic stressor.

With the exception of rigidity and affect-driven behavior, all of the cardinal features of PTSD parallel similar processes seen in hypnosis with normal subjects. "Hypnosis" is used to denote certain poorly understood phenomena (Hilgard, 1965; Orne, 1973), or interpersonal transactions that elicit them (Gill & Brenman, 1959). The phenomena include (1) *subjective nonvolition*, e.g., a hand "just lifts" in a hand levitation; (2) *altered perception, cognition and recall*, which can include vivid positive and negative hallucinations in any modality, as well as subtle but profound alterations in one's belief and recall; and (3) a partially regressed cognitive style often termed *adaptive regression*, similar to the creative process. It may involve a tolerance of incompatible perceptions that Orne (1959) calls "trance logic." Hypnotic transactions denote meaningful interactions between two or more parties, such that communications from one reliably lead to or "induce" hypnotic phenomena in the other (Beahrs, 1988, 1989). Hypnosis provides an ideal paradigm to study two great unresolved mysteries, the nature of "involuntary" action and "unconscious" awareness. Hence, it is among the most heavily researched phenomena in psychology.

The dominant tradition in current research – state" theory or "neodissociation" – has clarified the parameters of hypnosis in terms strikingly close to the mental aberrations that follow trauma. Dissociation is now believed to underlie hypnotic experience (Hilgard, 1977) as well as post-traumatic pathology. In a hand levitation, for example, the subject experiences his hand as "just lifting" while a "part" of him *purposefully* made the hand lift. The "doer" and "experiencer" are somehow disconnected. Or a subject can undergo painless surgery while a "hidden observer" fully experiences the associated pain and suffering (Hilgard, 1977).

Similarly, the process of hypnotization or "induction" is often formulated as a blurring of interpersonal boundaries, also the second post-traumatic feature. The subject incorporates the hypnotist into his or her own "ego" or self boundaries (Freud, 1921; Gill & Brenman, 1959), thus experiencing the latter's suggestions as if belonging to one's self. The third posttraumatic feature, distorted perception, cognition and memory, also virtually defines the gamut of hypnotic phenomena. Hypnotic phenomena differ from post-traumatic phenomena mainly in being flexibly malleable rather than rigid, and not necessarily driven by traumatic affect.

Clinical data reveals a strong link between catastrophic trauma and spontaneous hypnosis (Beahrs, 1988, 1989).

First, large scale surveys of terror victims (Terr, 1983; Symonds, 1980; Strentz, 1980) show that the experience of terror is accompanied by acute mental aberrations identical to hypnotic states. Second, mental disorders believed to follow trauma are generally associated with increased hypnotizability (Spiegel & Fink, 1979; Kluft, 1985; Stutman & Bliss, 1985), with multiple personality disorder often formulated as a disorder of hypnosis *per se* (Bliss, 1980; Beahrs, 1982). Third, spontaneous trances frequently occur in such patients, and often present formidable resistance to treatment (Kluft, 1982). It seems increasingly clear that catastrophic trauma somehow "induces" spontaneous hypnotic dissociation, binds it to the task of modulating traumatic affect, and rigidifies the patterns of behavior and experience that emerge (Beahrs, 1986, ch. 5) – while at the very same time these subjects have paradoxically acquired the skill to creatively modify their own experience, that we call hypnotizability (Spiegel, Hunt, & Dondershine, 1988).

From this data so far, we can now understand the first two aspects of my second evolutionary hypothesis, that trauma induces hypnotic dissociation that can be adaptive at several complex levels. First, faced with an emergency beyond one's usual coping skills, a person may enter an "altered state" in which dissociated elements (or the "unconscious") may "take over" – a process that can be life-saving (Beahrs, 1982, p. 39), using "trance as a coping mechanism" (Frankel, 1976). Second, when the mind so "splits," one sector becomes associated with traumatic affect, but not the other. The aversive force of this affect may serve to continually "push away" (repress, dissociate) the "traumatic sector" from usual awareness. This permits healthy coping to the "trauma-free sector," that can allow the critical functions of learning, growth and development to proceed without traumatic interference. This is achieved, however, only at the cost of never resolving the trauma. In primitive stable settings this price is minimal, since traumatic dissociation is more functional in those settings. Today, it is more likely to lead to a neurotic tradeoff (Beahrs, 1986, ch. 5) in which illusory comfort is achieved only at the cost of a life of neurotic misery.

Two additional lines of hypnosis research appear to conflict with state theory, leading to paradox whose resolution can go far toward understanding human mentation, and help to bridge the gap between psychodynamics and evolutionary biology. "Non-state" (skeptical") researchers have shown again and again that hypnosis cannot be separated from the waking continuum without absurdity; e.g., nonhypnotic control variables like task motivation can reliably induce hypnotic phenomena (Barber, 1972), and conversely, hypnotic suggestion may lead to the subjective experience of "free choice" (nonhypnotic). Whether all behavior is really nonhypnotic or all hypnotic, the term "hypnosis" appears to lose meaning as denoting anything special. To reject it as "unparsimonious" (Barber, 1972), however, would leave us with the profound subjective distinctions that first led to its use: involuntary from voluntary action, and unconscious from conscious awareness. This is the paradox, or a "A/Not-A absurdity" (Beahrs, 1982, 1986).

It can be resolved by an alternative interpretation (Beahrs, 1982, 1986, 1988, 1989): consciousness is complex throughout all waking experience; actions that "just happen," as in hypnosis, are consciously and voluntarily chosen at another level. Hypnosis retains its special quality, but can be separated from the waking continuum only as an approximation. "Social-psychological" research further shows that the *form* of dissociated entities like hidden observers varies inextricably with the *psychosocial context* in which they are elicited (Spanos, 1986), a context known to be clinically manipulable (Erickson, Rossi, & Rossi, 1976). Hypnotic structures are thus "real" subjectively, but not in the sense of an independent object. A prime example, is that one can create the subjective experience of nonvolition only by actions that remain fully conscious and goal-directed at some other level. In other words, they are *self-deception in relatively pure form.*

Hypnotic dissociation, then, can well be viewed as an elaborate form of self-deception in which one literally creates his or her own psychological reality, conforming its form or "structure" to the complex environmental pressures that we call "psychosocial context." This process must pervade all waking experience, but can be exaggerated in settings called "hypnotic," and is elicited and rigidified by the experience of catastrophic trauma.

Evolutionary biologists have independently clarified the importance of deceiving others in competition for genetic survival, and speculated that this can be done more congruently by also deceiving oneself (Dawkins, 1976; Trivers, 1985). Nesse (in press) points out how easily neurotic mechanisms like repression and symptom-formation can be understood in these terms. If one pleads illness or incapacity in the face of an overwhelming adversary, for example, he will be far more convincing if he actually experiences the impairment. If respected, this may not only ensure survival, but help him preserve honor or "save face" with peers and intimates. Alexander (1987) further explored the essential role of subtle and complex self-deceptions in the evolution of human morality. For a person to be deemed "moral" by others, he or she must not only obey the "rules" of indirect reciprocity, but the fundamentally self-serving basis for these moral behaviors must be carried out involuntarily, without conscious awareness – e.g., hidden by self-deception. That such deceit is widely shared and tacitly contracted throughout the highest stratas of society, is shown by the deference one usually grants to others' neurotic quirks, and the often-virulent initial response of a scientific establishment to new paradigms (Kuhn, 1970).

Seeing post-traumatic symptoms as a rigidified pattern of hypnotic dissociation, thus as essentially self-deceptions reified into what we call psychological "structure," is fully compatible with these evolutionary hypotheses. The more dangerous one's world, the more likely one is to have been traumatized. If hypnotic phenomena enable one to better avoid dangerous confrontations by using self-deception to better deceive others, we would then predict a high evolutionary pressure for selection of individuals who refine this capacity when exposed to significant danger. Further, this process should be experienced as subjectively involuntary, as are the symptoms of PTSD. Further supporting this hypothesis, is that subjective impairment usually far outweighs actual

objective limitations.

Hypothesis #3: Traumatic Affect Fuels Continuing Evolution

The third hypothesis is that traumatic affect may provide an important driving force for ongoing cultural evolution. Two lines of reasoning support this possibility. Traumatization leads, first, to a paradox of rigidification accompanied by enhanced creative potential, and second, to what resembles the prolonged emotional development that characterizes organisms higher on the evolutionary scale. The paradox arises from the content of the first two hypotheses. Using an analogy, traumatic experience imposes an emotional ball and chain that to some extent binds an individual throughout his or her subsequent life. At the same time, it offers provision for enhanced abilities (hypnotic potential) that can help transform the imposition into a mace and chain with which one can shatter additional barriers and help forge into new territory.

Traumatic affect is intensely motivating, readily becoming a prime organizing principle for subsequent development (Terr, 1983; Beahrs, 1986). And it does this in a way that simultaneously destabilizes the prior status quo, and establishes a new pattern that can become rigidly self-maintaining and resist futher change. This is a "stable instability," a term often used to distinguish living from non-living matter-energy. Evolution can be seen as "selection for stability" at more complex levels (Dawkins, 1976).

Beahrs (1977, p. 69) defined "evolutive impulse" and "stable configurations. . . upset by external forces to conditions of lower stability, which in the presence of these forces . . . resolve in a new direction . . . stability at a new level of organization." Traumatic affect is equivalent to the "external forces," and the "new level of organization" may relate to use of the enhanced capacity for new and unusual modes of creative thinking, often called hypnotizability. Many of the greatest achievements in art, science and politics have been made by trauma-driven men and women, and psychiatrists note that creative patients often resist traditional interventions but are also more likely to employ new and creative modes of problem resolution; i.e., more "evolved." Both poles of the paradox of traumatization thus contribute to what we might call "evolvability."

From another perspective, traumatic experience often induces what resembles a temporarily extended period of cognitive and emotional development. Prolonged development is characteristic of more complex organisms, and may be a major factor in their evolution (Bonner, 1988). Traumatic affect probably resembles the presumed state of infantile helplessness whose mitigation is a prime driver of child development. It may prolong child-like states both by "fixation" and by a more global "regression under stress" (Freud, 1916), either process leading to stable instability that can prolong the cognitive and emotional struggles of childhood and adolescence.

Post-traumatic effects are thus uniquely suited to stimulate cultural evolution, and many historical examples illustrate this process in actual living. Far more speculative is whether they may also play a role in biological evolution. Freud (1939) hypothesized the genetic transmission of certain post-traumatic learnings, but evolutionary biologists find no supporting evidence for Lamarckian inheritance. If biological evolution is indeed affected by trauma, the process is likely to be far more indirect. When cultural evolution succeeds in dramatically changing the very nature of the overall environment, the fitness potential of some genes should be enhanced at the expense of others. As always, natural selection will favor organisms that are more adaptable in the newly evolved current milieu.

FUTURE EVOLUTION: TODAY'S CHALLENGE

In summary, the characteristic forms of post-traumatic psychology probably evolved to enable mankind to adapt to specific environments in which external threats occurred in repetitive but relatively stereotyped form, serving much like "learned instincts," becoming progressively pathological only in rapidly changing complex societies like many in today's world.

Better dealing with psychological trauma must become a highest priority for modern man – not only for mental health, but for survival of the species. Given the ubiquity of traumatization, and its obvious potential to fuel mankind's bent for destructive defense of "honor," it is currently a major impediment to the goal of worldwide cooperation. Most problematic here is the profound *organizing* effect of trauma, both on individuals and societies. Traumatic blurring of boundaries helps people to unite against outside threats, and Alexander (1987) argues that defense against a common enemy has played a dominating role in the evolution of large scale social cooperation. He sees no evolutionary precedent for resolving an arms race in which the enemy has become ourselves. The challenge is whether we can redirect the creative abilities also stimulated by trauma, toward its solution – perhaps applying the concept of "enemy" progressively less to concrete individuals or groups, and more toward containing the destructive potential inherent in each and all of us.

For mental health, two countermeasures may help to free individuals and societies from the strictures of traumatic avoidance, toward more adaptive flexibility that can help us meet these challenges and better enjoy the rewards of psychiatric health. First is to minimize unnecessary traumatization, as by societal efforts to interdict child abuse. Second are the integrative psychotherapies known to resolve many forms of post-traumatic pathology (Braun, 1986). Since traumatization is not always avoidable, nor comprehensive treatment always desirable, another key may be to encourage subjects to creatively implement their autohypnotic abilities, so that what was originally a skill but later became a symptoms, can once again become a skill – hopefully at a more "evolved" level. ■

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