The Structure of Conscious Experience

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By Lee Roy Beach

Cambridge Scholars Publishing



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This book first published 2019

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data A catalogue record for this book is available from the British Library

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ISBN (10): 1-5275-3756-0 ISBN (13): 978-1-5275-3756-9 I owe a huge debt and vast gratitude to my friend and colleague, James A. Wise. For the two years it has taken to write this book, Jim has suggested, insisted, criticized, cringed, pleaded, encouraged, wept, and otherwise goaded me to think more clearly. Without his help, the result would have been far less satisfactory than it is. To my discredit, I didn't always heed his advice, which means that I alone am responsible for the errors and shortcomings.

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PREFACE

No knowledgeable person argues for a mystical mind. Clearly, thinking and behavior depend upon a well-functioning brain; impairment often results in impaired thought and action. Therefore, there must exist a point at which the molecular and electro-chemical processes that comprise brain function are transformed into rich, orderly conscious experience which seamlessly blends the present moment, what led up to it, and what will follow it. This is the stuff of our everyday lives and it raises questions about its organization, how it comes to be organized that way, how that organization relates to complex thought and varied actions, and how all of this facilitates engagement with the world at large. In short, what is the structure of conscious experience and what is gained by it being structured that way?

In an attempt to answer both questions, in what follows, I'll argue that conscious experience is structured in what is familiarly known as 'narrative form' and that the gain is the ability to make informed 'guesses' about what will happen in the fundamentally unknowable and potentially dangerous future.

Over the past 20 years, I've sought to understand the structure and function of conscious experience. This work has gone through a series of developments. The first focused on the narrative bases of decision making and resulted in TNT, the Theory of Narrative Thought (Beach, 2010). The second focused on expanding TNT to internal thought and communication with others (Beach, Bissell, & Wise, 2016). This essay describes the third development, focusing upon how narrative facilitates prediction of the future, detection of threats in that future (bad things or the absence of good things), instigation of action to mitigate those threats, and communication about all of this to oneself and others. Given how much the present version of the theory differs from past versions, and to reflect its changed focus, I've named it the *Theory of Narratively Structured Experience*, or, more conveniently *NSET*.

PART I:

THEORY

CHAPTER ONE

STRUCTURED EXPERIENCE

We all are preoccupied with the flow of our own and others' conscious experience, which we think about and talk about in the form of stories (e.g., Beach, 2010, Bruner, 1990; Fisher, 1989; Graesser, 1993; Steen, 2005). We tell stories to one another when we're together, and we tell stories to ourselves when we're alone. In the morning, we consult newspapers, TV, the internet, and radio to get updated stories about what is going on in the world. Throughout the day, we email, text, phone, or meet with others to swap stories about what we're doing and why, what we're going to do and what we expect the results to be. In the evening, we relax with stories in books, magazines, and on TV. Or we go to sporting events, which offer stories of striving and victory or defeat. Or we go to the movies, which offer drama, comedy, and romance in the context of stories. Or we attend social events at which we exchange stories in the course of conversation. Later, we read bedtime stories to our children and then read a few pages of a novel to lull ourselves to sleep. And as we sleep, we experience more stories in the form of dreams.

The general term used to refer to stories is *narrative*. A narrative is, in essence, a sequence of temporally ordered events (Atkinson, 1978; Carroll, 2001; Polkinghorne, 1988).¹

But it is not just a list. If it were, the first thing you would want to know is how the events are related to one another and how the relatedness influenced the order in which they occurred. In short, what were the reasons for the events and how did those reasons tie the events together into a meaningful flow? These questions ask for causes. Not just what happened

¹ Sometimes narrative succession appears to violate temporality by interpolating earlier or later events, as in flashbacks and flashforwards in novels, movies, and TV or in the undulating flow of everyday conversation. But the recipient (reader, viewer, participant) understands that the interpolated events took place at some time other than the present and are included because of their bearing on present events. Indeed, the ability to understand interpolations reveals that both the listener and the narrator recognize that events unfold over time and that earlier events have meaningful implications for later events.

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but why; how the earlier events influenced, shaped, caused the later events (Atkinson, 1978).

A narrative can be recounted in numerous ways as long as each version includes the key events and respects their temporal and causal order. This is evident when two people describe the same series of events. Not only do they seldom tell exactly the same story, seldom do either of them tell it exactly the same way twice. That different versions of events can be regarded as equally accurate suggests that they reflect something more basic, an underlying temporal/causal structure from which the various versions derive.

All of this adds up to people constructing what amount to stories for themselves and others that consist of events ordered by time and causality and that derive from and reflect a more basic structure. But this only accounts for the past and present; most narratives either describe or imply a future. If you read a mystery novel, you can predict what is likely to happen next (although an accomplished author will ensure that you predict incorrectly—which is what makes it a mystery). If someone tells you something, you usually can see the implications. And when you think about your present circumstance, and how you reached it, you can imagine where it will lead. In the latter case, you probably are right more frequently than you're wrong, especially in the short term. If you couldn't correctly anticipate what is going to happen in the next few moments, even the next few hours or days, you wouldn't know what to do next; you would live in a state of suspension, anxiety, and constant surprise.

Of course, the future has not yet happened so no one can predict with certainty what it will be. Humans have invented a variety of tools for dealing with this fact—fortune telling, divination, statistics—most of which require the user to have special skills or the help of people who have the skills. But, lacking expertise or an expert, tools such as these are unavailable to most people. Left to their own devices, they must rely upon their 'intuition' to provide glimpses of the future. Because these glimpses are all they have, they must treat them as accurate and act accordingly, hoping for the best.

There are many reasons for trying to glimpse the future but, in the long run, the fundamental, underlying reason is likely to be survival. That is, a glimpse could reveal potential threats and suggest actions to avert them or soften the blow. Of course, not all threats are about survival, but expectations of discomfort or pain are sufficient to warrant action. They do not even have to be physical; anticipated aggravation and hassle, potential loss of esteem, or the possible failure of opportunities or expected benefits to materialize are all threats that require mitigation. But, however serious, the most efficient way to handle threats is to anticipate them and deal with them before they cause damage.

Glimpsing the Future

Experience is rooted in changes in the internal or external environments that cause changes in the flow of sensory stimulation. The change in flow prompts the body to mobilize to deal with whatever is causing it. Mobilization stimulates internal senses and the resulting sensation is called *arousal*, which varies in intensity as a function of the magnitude of sensed environmental change.²

Although the flow of sensory activity is continuous, it is convenient to talk as though it consists of a series of discrete packages, called *events*, each consisting of the sensations deriving from environmental change and the arousal accompanying mobilization. A fresh event represents the present, what is happening at this moment, but, as yet, it has no meaning and its arousal has intensity but no valance (positive/negative).³ Meaning and valance require context and, to jump ahead a little, context is precisely what narrative is. So, when the fresh event takes its place as 'the present' in a narrative, it acquires meaning and valance through its connection to everything in the narrative that describes what led up to this moment, i.e., the narrative past, and its vast array of memories. This contextual interconnectedness endows the fresh event with 'thingness'-a person, object, or occurrence-and its arousal becomes emotion, with valance as well as intensity (Russell, 2002). And, insofar as the narrative is encoded in language, the part of it that is about the past provides socially learned, situationally contingent labels both for the fresh event's 'thingness' and for the accompanying emotion.

Causal Links and the Prime Narrative

Physicists may not be sure that the world is deterministic (Musser, 2017), but humans and other creatures behave as though it is (Cheng, 1997; Holyoak & Cheng, 2011; Lagnado & Solman, 2016; Sobel & Kirkham,

² In all that follows, 'environment' includes introception and proprioception as well as exteroception (Arikha, 2019).

³ It might seem that raw pain or pleasure would negate this statement. But, aside from reflex withdrawal from tissue- damaging events, even pain—and especially pleasure—are context dependent. Even for something as basic as sex, what is pleasurable in one context may be repellent, perhaps painful, in another.

Chapter One

2006; Solman & Lagnado, 2015). We operate as though everything that happens has been caused by something that happened previously and will be the cause of something that happens subsequently. Treating the links in a temporal sequence of fresh and past events as *causal* makes the sequence into a story, a *narrative* about how events in the moderately distant past led to (caused) events in the immediate past, and how this culminated (caused) in the fresh event, what is happening right now.

Because this narrative about current experience is the foundation for so much else—threat detection, focus of action, communicating with oneself and others—and to distinguish it from the narratives that pour from the media and social interactions, that it has a distinctive name, the *prime narrative*. It is *conscious experience*, the story about what is going on in our lives at the moment, what we think about and what we talk about with others.⁴

Causal links in the prime narrative have direction and strength. Direction means that occurrence of an event influences the occurrence of subsequent events, which reflects the links' temporal origins. Strength is how directly that influence is exerted. That is, causal links aren't necessarily direct but the more direct they are the stronger they are.

The strongest, first-order links, are between a cause and its direct effect, $A \rightarrow Z$. Slightly weaker second-order links are between effects that are result of an intermediary event that was itself directly caused, $A \rightarrow (K) \rightarrow Z$. Even weaker third-order links are even more indirect, $A \rightarrow (K \rightarrow M) \rightarrow Z$. And so on. But, in most cases the link is treated as being between events A and Z; everything in-between is merely supportive of that link.

Indirect causality is weaker because it is less determinate, less reliable. This is because intermediate events have their own links (lateral links) with events that are largely irrelevant to what is happening at the moment. Lateral links enrich the prime narrative by increasing interconnections among a wider range of events, providing context. But, they also introduce opportunities for things to go in unpredictable ways. Thus, if the prime narrative contained only first-order links, everything would be simple (no lateral links) but highly determinant (reliable) because every event would have only one cause and one effect. A mixture of first-order and secondorder links would be richer (because of lateral links), but less determinant and the results would be less reliable. Adding third-order links would be even richer (even more lateral links) and even less reliable. And so on.

⁴ Note that the prime narrative incorporates what was called the current narrative in the 2016 book and the present formulation supersedes the current narrative's formulation.

The Implied Future

The prime narrative tells a causal story that unfolds over time, ending with the fresh event, what is happening at the present. 'This happened because of that, which caused something that resulted in something else that is happening right now.' In principle, the story ought to stop at the present because the future has yet to happen so there are no events to add to the narrative.⁵ But it does not. Because past and present events are organized by time and causality in the narrative, the future always is implicit as yet-to-occur effects of present causes, the results of what is happening right now and what led up to it. Causality implies predictability; if, in the past, X caused Y, then if X is occurring now, the future occurrence of Y is implied. At the moment that X is occurring, Y is merely a causal implication because it has not yet happened, but it is the best prediction about what, in fact, will happen.

And, each of those implied future events imply events further into the future, and those imply even more remote events. In principle it ought to extend to infinity, but, in fact, the implied future has a *time horizon*, a functional end point. Time horizons exist, in part, because creatures, including humans, lack the capacity for dealing with long sequences of implications. Time horizons mark the point at which the implied future contains so many possibilities it simply is not possible to assert that one future is more plausible than another.

Major Change

Any change in the flow of sensory activity is important because it is tracking changes in the internal and external environments. Routine changes mean that the fresh event is very like the last fresh event, because the

⁵ Boundaries between the past, present, and future are slippery. The past is reasonably knowable; it is memory. And, aside from inferences about it, the future is unknowable because it hasn't happened yet. The present is the hard case because, technically, it almost doesn't exist—in an instant what was the future becomes the past and it is that instant that is the present. But this isn't how the experienced present appears to us—it isn't just an instant, it has extension. In fact, what we experience as the present is a trick of the nervous system, usually referred to as working memory. The trick consists of bundling together the most recent memories (the last few milliseconds) to give the illusion of extension. In this sense, we're always living in the past, it is just that in this case the past was a millisecond ago, so it is as good as being right now. It is this argument that justifies packaging experience as events for our discussion.

environments simply are evolving. But, non-routine changes mean that something new is going on and the prime narrative has to adapt to it so threats are properly anticipated.

A big change from the routine produces a fresh event that does not follow from the events that make up the past in the prime narrative. This reduces the prime narrative's coherence and increases uncertainty about its predicted future. As we'll see in a moment, low coherence and high uncertainty are intolerable. The discomfort prompts reorganization of the prime narrative, primarily by using the attributes of the misfit fresh event to probe memory for past events that can account for it, that could have caused it. This means that past portion of the prime narrative is replaced by a new past, a new backstory, which is consistent with the fresh event. The result is that the prime narrative changes to reflect the new circumstances. This is how attention shifts to accommodate changes in what is going on.

For example, you're working in your garden when your neighbor intrudes to complain about the stench of fertilizer. What had been a narrative about soil and plants, and how to nurture them, changes to a narrative about the unhappy neighbor and the odor. After the neighbor departs, the gardening narrative is gone, replaced by a narrative about the neighbor, the implications for your future interactions with him, what makes him so inclined to be cranky, what is causing the odor, and so on. In short, the prime narrative changed, your attention shifted, to accommodate the intrusion of the neighbor and his concerns.

Coherence and Plausibility

The more strongly bound the prime narrative's constituent events, the more coherent it is; the story it tells 'makes sense'.⁶ And, a coherent story is a plausible story; it is believable. The philosopher, Frank Ramsey (1927), said that belief excludes possibilities. That is, belief decreases uncertainty by restricting what one can conceive of happening. Which is precisely what a coherent, plausible prime narrative does. It narrows the range of conceivable future events, thus narrowing the range of conceivable threats, thus narrowing the focus of mitigating action. So, increased coherence equals increased plausibility (believability) equals increased certainty.

⁶ Moreover, Trabasso & Sperry (1985) found that the importance of an event in a story was a function (1) the number of direct causal connections between it and other events and (2) whether or not the event was in a causal chain from the opening to the closing of the story. These same two factors also account for accuracy of immediate and delayed recall of items (Trabasso & von den Broek, 1985).

Intolerance of low coherence and plausibility has a long history in psychology. It is seen, for example, in Max Wertheimer's (1923) Gestalt principles of perceptual organization and gravitation toward good form, in Frederick Bartlett's (1932) "effort after meaning," and in numerous other contexts, including the many varieties of cognitive schema. Coherence is so important to the theory, to NSET, that it is worth examining a bit closer.

Wertheimer's Law of Prägnanz, also called the Law of Good Gestalt or Good Form, says that perception naturally tends to group elements together to create a good Gestalt; simple, orderly, balanced, unified, regular, concise, and, in a word, coherent. This doesn't happen because the perceiver wills it to do so, or because outside forces make it happen. It is inherent in the perceptual system. It is what allows the stimulation of multitudes of cells in the retina or on the tympanic membrane to be perceived as objects or melodies rather than merely as points of light or random noise.

In Bartlett's classic work on memory, subjects were presented with stories and, at a later time, asked to recount them. It was found that meaningless or extraneous details were dropped from the retelling and new ones added to increase the story's coherence. The process was not intentional on the part of the subjects. Bartlett interpreted it, and other of his experimental results, as evidence for reconstructive memory rather than simple recall from storage.

Work on cognitive schema, arguably beginning with Bartlett's early work and becoming a very popular concept in the 1970's and 80's, was more of the same. Schemata are characterized as active organizations of past experience, structured knowledge, and they are known by many names: scenarios, mental models, scripts, images, and so forth. They typically consist of elements and the relationships among them and have dynamic mechanisms for their own revision in light of data derived from their use.

In all these cases, and more recent variations on them, the idea is that a structure is governed by "coming into form." The principles that govern it favor conciseness, order, and meaningfulness—coherence.

Emotion

You perhaps will recognize the contextual dependency and labeling of emotion discussed earlier as similar to other 'constructive' theories of emotions. The currently most celebrated of the latter is by Lisa Feldman Barrett (2017), a psychologist at Northeastern University. Three aspects of her theory are particularly pertinent to our discussion: *body budget, affect,* and *emotion.* Body budget, is vaguely like homeostasis (but not quite) in that the body has limited resources that the brain allocates for dealing with change. The body's momentary budgetary status is reflected in affect, which is barebones feeling that has *both* valance and intensity. Emotions are learned categories of contextualized affect.

You can see the similarity in views, which is not surprising because the idea of constructed emotions is not new and because Barratt's views have greatly influenced mine.⁷

But they aren't identical. Both Barret and I differentiate between basic arousal and emotion, and see the latter as the result of contextualization and socially learned labeling. In her case, however, basic arousal, which she calls 'affect', has both valance and intensity. In the present theory, NSET, arousal only has intensity, no valance; the word 'affect' is unnecessary. This is because it seems to me that valance is context-dependent, and contextualization does not occur until the fresh event is situated as 'the present' in the prime narrative. Indeed, the prime narrative *is* context. That is what it is for, if you will. It arranges the present in relation to the past by arraying them by time and causality to create a coherent whole. (Except, of course, it does not have agency so it actually does not *do* anything. Imposition of time and causality simply results from this arrangement.)

Barrett's theory also involves prediction, but it is limited to the brain verifying that its decision about what caused change is right—in a feedback loop—before acting. NSET, of course, sees prediction in a very different way; anticipation of the future in the service of threat detection. In addition, Barrett uses classification as the mechanism for contextualizing incoming information about the internal and external environments, and the class membership provides the information needed to transform affect into emotion. NSET uses the prime narrative, the story about how the past led up to the present (the fresh event) for contextualizing. It seems to me that Barrett's mechanism requires a catalogue of classes and a set of rules for classification that aren't really addressed by her theory. It is finessed by saying that the brain does it, which is not much of an explanation.

It does not seem to me that Barrett has a 'goodness of fit' concept in her theory. True, verifications of the brain's predictions are used to adjust bodily resource allocations, but there is no evaluative mechanism for

⁷ Barret's views, and mine, are not that different from other constructionist theories of emotion. What is unique about Barnett, however, is her careful tying together of the research refuting earlier ideas about the universality of emotions and their expression and the research supporting constructed emotion. I recommend her book to you, if only because I find myself on thin ice (even thinner than usual) when it comes to the research on emotion; the literature is huge and contentious. I take some comfort in the fact that by aligning myself with Barrett, the present theory, NSET, conforms with current research and theory.

contextualization. What happens if new information does not fit the preexisting categories or fits more than one? This evaluative mechanism for contextualization in NSET is the coherence of the prime narrative after a fresh event is added. If it does not fit well because the prime narrative, as it is currently formulated, is inappropriate (there has been a big change in the world), the resulting low coherence reduces the plausibility of the predicted future, which means that predicted threats may be moot and/or potential threats are going undetected. This uncertainty about threat prompts restructuring of the prime narrative to bring it into agreement with the latest information—the fresh event. Restructuring involves replacement of the past events in the narrative to conform to the present, fresh, event—this is how attention shifts to accommodate new things happening in the internal and external environments.

Why the Narrative Form?

Why is conscious experience structured in narrative form? Why not some other form? Isn't it just a little too convenient, not to mention highly improbable, that evolution led experience to be organized in a form so familiar to all of us?⁸ The answer is that the form is familiar because it came first, before there were any novels, TV, conversations, etc. They derived from it, not the other way around. It isn't that structured experience, the prime narrative, mimics the narratives with which we're all familiar, it is that they mimic structured experience.

Narratively structured experience probably evolved over a very long time and, because it increased the chances of survival, became common to all humans and, perhaps, to a wide range of other animals. Steen (2005) neatly summarized the evolutionary view, "... [narrative] is made possible by a complex suite of well-established and tested adaptations with a deep biological history. ... [N]arrative in its elementary form is an evolved mode of construal, a systematic method for making sense of specific aspects of existence, notably those that involve the task of predicting what agents will do. This mode of construal ... plays a key role in interpreting as well as in generating strategic action... [It] piggyback[s] on and recruit[s] a set of neurobiological circuits that were subject to natural selection over various periods, some relatively recent and others stretching all the way back to the early mammals" (not paginated).

⁸ Improbability is not a good argument. In retrospect, pretty much everything about every living thing is improbable.

A parallel argument to Steen's and mine, Professor H. Allen Orr (2016), a biologist at the University of Rochester, discussed the implications of the fact that the established genetic code is nearly universal to all life on earth. That is, the fact that we share the code with bacteria, fungi, plants, and every other animal, (including all humans) who lives or has lived. Which prompts the question, very similar to 'Why Narrative', 'Why this genetic code and only this code?'

Orr's answer is that we all share a common ancestor that lived millions of year ago and that ancestor had this code. "If it were to change...the structure, hundreds of thousands of proteins would suddenly and simultaneously change, a certain formula for disaster for any organism that tried it. While there's no obvious physical or chemical reason why certain letters of DNA encode certain amino acids, once life settled on a code early in evolutionary history, it couldn't be changed without catastrophic consequences. [Sir Francis] Crick called this the "*frozen accident*' hypothesis". [Emphasis mine.]

In short, this primeval code probably arose accidently but became universal because it worked. The ancestor that had this code survived and the others didn't. It isn't that other codes couldn't exist or didn't exist, it is just that this one allowed its possessor to survive and pass it on to its offspring, who also survived to pass it on.

The argument for the narrative form of structured experience is similar—a 'frozen accident' that incorporates our unique genetic history of survival. As the offspring of the narrative form's possessor(s) thrived and the others died out, it became universal. And, as modern humans emerged, their possession of the narrative form became further elaborated, resulting in the flexibility that we all recognize in ourselves and those around us.

Of course, the key to all this was that the narrative form supported prediction of the future, which enhanced survivability. Forewarned is forearmed, and because narrative ties the past to the present and supports prediction of the future, potential threats can be anticipated and action can be taken to mitigate their impacts or to prevent them from occurring at all. In virtually every living being, there is at least a minimal ability to anticipate and initiate defensive action, even if it is only reflexive withdrawal.

Ability to anticipate and act, however simplistically, doesn't mean that all beings have an elaborate narratives. But, insofar as what they have ties the past to the present and permits anticipation of the future, insofar as causality and time are the underlying structure, they are at least protonarrative in nature, if not strictly in fact.

If the foregoing answer to 'Why Narrative?' is acceptable, it means that we've to get our timelines right. It isn't that we simply label what the brain does as 'narrative' because it is a word that we all understand. It is the other way around; it is because narrative is what the brain does that we all understand what the word means. The brain came first, and all the literature, TV, gossip, folklore, and the stories we tell ourselves in our heads, derive from that. The narrative form was, in fact, cognition's 'frozen accident'.

CHAPTER TWO

EXTENDING THE FUTURE

In the course of evolution, creatures who could anticipate the future and mitigate threats were the ones who survived to pass on their ability to their offspring. But, even at that, for most species, the immediate future is the only future and mitigation consists of built-in, evolved responses to specific kinds of threats. Any threat for which there is no built-in response will go unmet, risking discomfort, pain, or death.

Somewhat more sophisticated species retain these built-in responses but also have evolved the ability to generalize both their responses and the range of threats they address. Plasticity increases as species' neural complexity increases, reaching its maximum in humans. Although we've retained many built-in responses (e.g., reflex withdrawal from painful stimuli which stops further discomfort and prevents further tissue damage), evolution also has provided us with the ability to anticipate and mitigate both immediate and remote threats by addressing their present causes.⁹

This ability probably stems from our social nature. Humans are social because in infancy we're defenseless and even as adults we're vulnerable. Growing up involves our elders teaching us what they were taught about what to do when our built-in reflexes are insufficient; passing on the culture's accumulated knowledge. And, interacting with those tutoring elders, and everyone else, requires us to learn to communicate. We do this by learning language, for which we have evolved a proclivity—perhaps another frozen accident.¹⁰

⁹ Even though the threat is assumed to lie in the future, mitigating action has to be implemented in the present—you can't act in the future because it doesn't exist— although, as we shall see, you can plan now to act later.

¹⁰ Anthropologists think that language developed to facilitate instruction and coordination of action—for example, how to make weapons, how to jointly participate in a hunt, how to prepare food. Perhaps it allowed the demonstration of the required sequence of actions to be augmented by commentary that provided more generality. However it came about, language is an intrinsic part of being human. Its function is to communicate with ourselves and others about our structured experience, including our expectations about the future, about threats among those

Communication doesn't happen unless there is something about which to communicate. This 'something' is provided by the prime narrative. A communication recapitulates the prime narrative's narrative form—past, present, future—but before all of this can be communicated, it must be encoded in language.¹¹ Then, when the communication is passed on to someone else (or to oneself in the form of internal thought) it can be sensed (sound stimulation), added to their prime narrative, and subsequently used in their communications.

Creatures that lack language are at a disadvantage because their future is limited to the fairly immediate future. Those of us who have language can extend the future beyond this limit because language has two important properties. First, by attaching labels to actors, actions, and results (to causes and effects), language enables us to both think about and talk about nonproximal entities and episodes—objects and events that are remote in time and space. (And from here it is but a short step to abstract thought about objects and actions that either do not exist or only exist in our heads—like deities, luck, characters in novels and movies, black matter, the soul, and abstract theories such as NSET.) As a result, talking to ourselves and others takes over where the shallow future afforded by the prime narrative ends just beyond the edge of the present—thus extending the future beyond the immediate future into intermediate and remote time.

The second important property is that language encodes the strongest bonds in the implied future, even when none are particularly strong.¹² The result is that the future need not end where branching leads to unreliability because it is too complex.

Of course, communicative narratives involve more than just words; gestures, laughter, and facial expressions can be eloquent; a kiss is a conversation without words and laughter conveys a multitude of meanings (Glenn & Holt, 2013)¹³ Even so, language is a major part of it. Right now,

expectations, and about how to thwart those threats so that the future, when it becomes the present, is less painful than it otherwise would have been.

¹¹ As was stated earlier, a portion of the prime narrative may already be encoded in language as a result of hearing (sensing) relevant messages from others or oneself. The older one is, the larger the portion.

¹² And it also can follow weak bonds, which gives rise to imagination and fantasy. But most people can distinguish between following the stronger thread, which they take seriously as a prediction of the future, and following weaker threads, which they regard as improbable and imaginary.

¹³ Francis (2018), in a review of Glenn & Holt's book, summarizes: "Broadly speaking, laughter shows up ... in two kinds of environments: celebrations and trouble. In moments of celebration, it allows people to laugh together, appreciate,

you're reading what I'm trying to communicate; language. You talk to yourself to clarify your thoughts; language. You talk with others, most frequently to induce changes in their behavior (however benign your intentions) or to gain clues about the future; language. You're entertained by books, TV, movies, plays, songs; language. In fact, language is the primary tool for social interactions and for internal dialog. The key word in that last sentence is 'tool,' which is anything that helps us in our efforts to extend and deal with the future.

Returning to the question of the shallowness/depth of other species' futures, consider the importance language has in not only extending the future but in establishing cause and effect between events that are greatly separated in time—even when the length of the separation is variable from one encounter to another. Light is cast in this by research reported by Professors Can Kabadayi and Mathais Osvath (2017), Lund University in Sweden, who study animal's ability to use tools and how far ahead they can plan for using them.¹⁴ The latter allows for estimations of their maximum time horizons:

Even animals who lack language must have some appreciation of the future. But some species are better at it than others. The champions are humans and next are the great apes (not monkeys). But the apes are rivaled by at least two kinds of Corvids (jays and ravens) that can gather and put aside tools and barter-objects for use 12 to 17 hours in the future. This requires the birds to anticipate future opportunities and to plan for the exploitation of those opportunities—and they do it better than 4 year old human children.

Ravens are as adept as the great apes (and better than orangutans, bonobos, and chimpanzees) at putting aside objects for barter. Thus language-lacking great apes and Corvids appear to possess a structured understanding of their own experience—past, present, and future—and an appreciation of causality, time, and the role of action in creating a desirable future. However, their apprehension of that future appears to be limited to less than a day. Given the available evidence, it appears that only language-

affiliate, and even claim a kind of intimacy. In moments of trouble, it provides a resource for aligning, modifying actions, and mitigating meanings. (p. 21).

¹⁴ Consider also the discovery by Austrian ethologist Karl von Frisch of bee communication via 'dances' that indicate direction and distance of food sources. Although not usually noted in discussions of von Frisch's work, the use of dance to communicate location implies that the dancer bees anticipate that the observer bees will use the information—a prediction about the future. For a popular discussion of animal consciousness see Andersen (2019).

using humans can significantly extend the future. And only they can link entities that are separated greatly in time.

This last point, time separation, is addressed in an article, *Sex makes babies* (2017), by Holly Dunsworth, University of Rhode Island, and Anne Buchanan, Pennsylvania State University, from which I simply will quote:

"As far as we know, there is no animal that spends time dwelling on what it cannot perceive with its senses other than the human animal. Understanding where babies come from can't simply be observed. It requires grasping that a rather routine activity today will have long-term consequences in the future-connecting a long-ago act to the baby mice, kittens, baby gorillas or newborn whales and elephants born 20 days, two months, eight months, or almost two years later. Among the few of us, including bonobos, that copulate while pregnant—which can shrink the time between cause and effect—being able to link the business and substance of sex to pregnancy and its outcome would still take the kind of wild imagination that only humans are thought to possess. *That, plus language,* helps us to think these sorts of abstract creations and to communicate them. Once we're a few years old, humans begin to explain the unobservable. Soon thereafter, we're weaving and repeating stories about where babies come from. And it's not much longer until we're seasoned gossips about tribe members. [Emphasis mine.]

"Abstract conceptual ability, what Povinelli [2004] refers to as a mind primed to think about 'ghosts, gravity, and God', is among the few exceptional human traits that primatologists, who are ever narrowing the divide between us and our closest non-human relatives, can embrace. To quote Povinelli: 'The mental lives of humans and chimpanzees are *similar*, in that both species form innumerable (and in many cases, identical) concepts about observable things, but, at the same time, are radically different, in that humans form additional concepts about inherently unobservable things.' As far as we understand non-human cognition today there is little to suggest that other animals hold beliefs, material or spiritual, about pregnancy or baby-making, or that they understand that anyone is related to babies, especially males. Without a vivid imagination for the past and the future and the mysterious connections between them, such an understanding couldn't exist."

CHAPTER THREE

THREATS

When you were an infant, an acceptable future was simply one in which current physical discomfort wouldn't continue. As you grew older and accumulated sufficient past experience upon which to base prediction, you could anticipate both continuation/discontinuation of existing discomfort as well as discomforts that hadn't yet occurred—bad things happening, the loss of good things that already are happening, or the failure of good things to happen, all of which are emotionally negative. Part of that accumulated experience was personal life experiences and part was the result of instruction by your parents, friends, and teachers about what is good and bad, what is and is not desirable, what is and is not a danger. Some of these are imperatives—what is ethical, right, proper, principled, reasonable, appropriate, and so on, which are called morals, beliefs, and values. Some are merely transitory wants and needs, which are called preferences.

In addition to learning what is good and what is not, you learned how good or how bad you can expect to feel when they occur or fail to occur. It is your expectations about how bad you'll feel that define threats. That is, threats are anticipated negative emotion associated with people objects, and events in the predicted future and the anticipated degree of negativity of the emotion is called the threat's *emotional intensity*.

Appraisal of threats turns on the negative emotional intensities of the events in the predicted future. An *emotional standard* is the maximum acceptable negative emotional intensity for a predicted future event and for the predicted future as a whole. Emotional standards are, in fact, thresholds that derive from both previously experienced negative emotion and socially transmitted rules about what will/should evoke negative emotion and how much is too much. The premise is that anything that was experienced as negative in the past will be so in the future and anything you've been taught is negative will be so in the future.¹⁵ When the sum of the threats associated

¹⁵ In an interesting essay on values, Professor Troy Jollimore (2018) states; ... "[M]uch contemporary scientific research also supports the Aristotelian idea that rather than seeing emotions as mere drives or urges, we should see them in some

with events in the prime narrative's predicted future exceeds the allowable threshold, action is taken to make sure things don't turn out as unpleasantly as anticipated.

Socially learned emotional standards can be divided into enduring values and transient preferences. Values consist of your morals, ethics, and ideals—equity, justice, solidarity, stewardship, truth, beauty, and goodness—together with your moral, civic, and religious precepts and the responsibilities you assume in the course of performing your daily duties and engaging in social interactions.¹⁶ Preferences are your wants and partialities. Their emotional intensities may vary over time and circumstance but the often are no less compelling than your ethics and ideals. Together, your values and preferences dictate what about the future exceeds the threshold for negative emotion and what does not. (Remember, the potential for negative emotions resulting from something good not happening is as much a threat as the potential for negative emotions resulting from something bad happening.)

It is the urge to prevent highly negative emotions from occurring that motivates action. When the overall emotional negativity of the predicted future exceeds a tolerable maximum, it is deemed too threatening and action is taken to make the future, when it becomes the present, as unthreatening as it can be given the time constraints. After all, the immediate future is just about to happen and even the remote future is often not that far off.

ways as analogous to beliefs: mental states that reflect and hence inform us about the world. Although the contrast between reason and the emotions, like the distinction between fact and value, is a deep assumption in most post-Enlightenment scientific thinking — and one that lay at the root of the positivism that ruled by science and philosophy for most of the 20th century — the more recent trend among many scientists, as well as philosophers, is to complicate if not deny the distinction. For example, Antonio Damasio, professor of neuroscience at the University of Southern California, argues in *Descartes' Error* (1994) that there are close and complicated relations between emotions, physiological states, and rational thought.

¹⁶ Ángel Gómez, et al. (2017) examined the role of values as motivators for combatants fighting against the Islamic State (ISIS, ISIL), including members of the Kurdistan Worker's Party (PKK) and other frontline fighters in northern Iraq, Peshmerga (Kurdish Regional Government forces), Iraqi army Kurds, and Arab Sunni militia. Results showed that combatants' "willingness to fight is associated with sacrifice of material concerns (fighters' lives, well-being of kin) for the sake of sacred values, and with the weight [given] to the relative spiritual (rather than physical) formidability of themselves and their adversaries" (p. 676).