**The Basics of the Theory of Narrative Thought and the Structure of Conscious Experience**

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 We all are preoccupied with the flow of our own and others’ 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 are together, and we tell stories to ourselves when we are 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 are doing and why, what we are 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*. This article explores the proposition that experience is structured as a narrative in which the past and present imply the future, allowing identification of potential threats in that future, and guiding action to prevent, avoid, or diminish them before they occur. In addition, narratively structured experience provides the shape and content of the narratives we tell ourselves and others. What follows is a theory about how this works.[[1]](#footnote-1)

**Overview**

 A narrative is, in essence, a sequence of temporally ordered events (Atkinson, 1978; Carroll, 2001; Polkinghorne, 1988). 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 and vice versa.

 But, of course, a narrative is not just a list. If it were simply events ordered by time, the first thing you would want to know is how the events are related (implication) to one another and how it 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 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 telling stories to 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 are wrong, especially in the short term. If you could not correctly anticipate what is going to happen in the next few moments, even the next few hours or days, you would not 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 ‘intuitive’ predictions about the future. Because their predictions 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 primary 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.

**Structured Experience**

**Events**

 It all begins when changing aspects of the internal and external environments engage various senses and are bundled by perception into *events*, each of which incorporates the emotional state at the time of sensory engagement; emotional states have valence (good-bad) and scale (strength or degree). Then the newly perceived events link with immediately preceding events as well as with the events that proceeded those events, which are stored in memory. This produces a temporal sequence of linked events that extend from the moderately distant past, through the immediate past, to the present—, i.e., to the newly perceived event.

**The Prime Narrative**

 **Causal Links**

 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, 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 temporal sequence of events as *causal* makes it into a *narrative* about how events in the moderately distant past led to events in the immediate past, and how this culminated in what is happening now. Because this narrative about now is the foundation for so much else—threat detection, focus of action, communicating with oneself and others—I have given it a distinctive name, the *prime* *narrative*.

 **Causal Strength**

 Causal links 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 are not 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→Z. Slightly weaker second-order links are between effects that are result of an intermediary event that was itself directly caused, A→(K)→Z. Even weaker third-order links are even more indirect, A→(K→M)→Z. And so on. But, in all 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. 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 thrust of the prime narrative by increasing interconnections among a wider range of events, but they also introduce opportunities for things to go in unpredictable ways, i.e., less determinant. 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 second-order links would be richer (because of lateral links), but less determinant because the results would be less reliable. Adding third-order links would be even richer (even more lateral links) but even less reliable. And so on.

 **The Implied Future**

 The prime narrative tells a causal tale that unfolds over time, ending with 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 tale ought to stop at the present because the future has yet to happen so there are no events to add to the narrative. 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.

 **Coherence and Plausibility**

 When the prime narrative’s constituent events are strongly linked—when it tells a straightforward, clear, causal story—it is coherent. That is, it hangs together and tells a simple story. Because there is no way of telling if the prime narrative is or is not true until its predictions about the future prove accurate or inaccurate, coherence serves as a surrogate for plausibility (truth, and believability). That is, if the prime narrative is coherent, you are inclined to believe it is true.

 Of course, it also works the other way; low coherence suggests the prime narrative is implausible, which results in uncertainty about the events in its implied future. Uncertainty creates unfocused anxiety, which is emotionally negative, and the greater the uncertainty the greater the anxiety.

**Change**

 The prime narrative, what is happening now. Therefore, it changes when the perceived changes in the internal and external environments (including changes prompted by our own thoughts), signal that something new is happening for which a new backstory is required. This change in the perceived present prompts retrieval of past events from memory that is different from those that preceded the change. The result is that the prime narrative’s story changes to reflect the new circumstances (i.e., a shift of attention).

 For example, you are 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 cranky, what is causing the odor, and so on. In short, the prime narrative changed to accommodate the intrusion of the neighbor and his concerns.

 I will examine how the prime narrative and its predicted future support threat detection and mitigation in section 4.0, but first....

**Why Narrative?**

 It might seem just a little too convenient, not to mention highly unlikely, that experience is organized in a form as familiar and ubiquitous as narrative. But, of course, the narrative form is familiar precisely because it came first, before there were any novels, TV programs, conversations, etc. It is not that the narrative structure of experience mimics the narratives with which we are all familiar, it is that the latter mimic the narrative structure of experience.

 Still, the question remains, ‘Why narrative?’ As I suggested at the end of section 1.0, the answer may lie in the basic need of every creature to anticipate and mitigate danger in order to survive, or at least to forestall undue discomfort. I suggest that narrative is evolution’s solution to that need—the vehicle for leveraging the only resources possessed in common by every living creature, each individual’s unique past and present, to supply an implied future. Its value is that, as we shall see below, it narrows the range of likely threats, thereby limiting the range of actions required to prevent them from inflicting pain or jeopardizing survival.

 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).

 A parallel argument to Steen’s and mine, Orr (2016), examined the implications of the established genetic code being nearly universal. That is, each of us shares the code with bacteria, fungi, plants, and every other animal, (including every other human) who lives or has lived. Which prompts the question (similar to ‘Why narrative?’), ‘Why this genetic code and only this code?’

            Orr’s answer is that we all share a common ancestor who lived millions of year ago and that ancestor had this particular genetic code. It was passed on and after many generations it was widely shared. 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 added].
            In short, this primeval genetic code probably arose by accident but became universal because it worked. The ancestor that had this code survived and others did not. It is not that other codes could not exist or did not exist, it is just that this one excelled in allowing its possessors to survive and pass it on to their offspring, who also survived to pass it on.

 Perhaps the answer to ‘Why narrative?’ is similar—a ‘frozen accident’ that is frozen because it works. Its early possessors thrived while others did not, until 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.

 If the foregoing answer to ‘Why narrative?’ is plausible, it means that we have to get our timelines right. It is not that we simply label structured experience as ‘narrative’ because it is a word that everyone understands. It is the other way around; it is because narrative is how experience is structured that everyone understands what the word means. The narrative structuring of experience came first, and all the literature, TV, gossip, folklore, and the stories we all tell ourselves and other people, derive from that. The narrative form is a ‘frozen accident’.

**Threats and Action**

 Returning to the main discussion:

**Threats**

 Threats are events that were emotionally negative in the past and therefore may be expected to be similarly negative if they occur in the future. Presuming that the predicted future is accurate (and it is all you have to depend upon, so the presumption is efficient), your comfort, even survival, depends upon identifying and mitigating threats before the future becomes the present and the anticipated negative emotions become reality. This requires an evaluation of each event in the predicted future and a decision about its potential for negative emotion as well as an overall decision about the cumulative negativity of the entire prediction. That is, the usefulness of the prime narratives’ implied future is not that it provides a glimpse of the future per se, it is that it provides a glimpse of the emotional negativity of that future. Few futures offer unalloyed joy but when the overall negative potential is significant, action must be taken to change the future before it happens. (The appendix contains a decision model for threat evaluation.)

 Threats are not solely events with the potential for physical or emotional harm. They also are events with the potential for loss of existing good things or the potential for good things to not materialize. Thus, the potential failure to obtain food is distressing because it also is the potential for hunger and, eventually, starvation. The potential failure to get a raise in salary is also the potential for being unable to adequately care for oneself and ones’ dependents. The potential loss of a business deal is also the potential loss of esteem by one’s colleagues. And so on. The point is, threats are not just about the potential for negative emotions (qualms, fear) if bad things happen, they also are about the potential for negative emotions (grief, disappointment) if good things cease or do not happen at all.

 And, as these examples illustrate, not all threats are dire. Day to day life seldom presents extreme, life-threatening danger—except perhaps when you are driving your car. Most daily threats range from mild to modest potential discomfort that requires minor mitigating adjustment. But even mild threats can amount into something serious if there are enough of them.

**Actions**

 Actions are physical manipulations of the internal and external environments that are guided by causal links in the form of *causal* *rules*. Causalrules, acquired through both experience and instruction, specify the results that your actions can be expected to cause, thereby telling you what to do to produce a specific result. They also specify the results that other people’s or natural forces’ actions can be expected to cause, either spontaneously or in response to your actions, thereby telling you what to expect as repercussions of your actions. A contingent sequence of causal rules is a *plan*; where contingency allows for doing either this or that depending upon the result of previous actions (Beach, 2010, Beach, Bissell, & Wise, 2016).

 Implementation of a plan consists of the sequential execution of each causal rule in the plan. As each step produces a change in the internal or external environments, the change is sensed, perceived, and changes the prime narrative to represent what is going on right now. Changes in the prime narrative’ now change the predicted future—hopefully making its threats less threatening. Because actions in the sequences are contingent, if an action (or series of actions—because their effects are not always immediate, especially when changing the distant future) results in the predicted future becoming less threatening, the next action(s) in the sequence is executed. If an action increases the threat, new action(s) is retrieved from procedural memory to correct for the setback and decrease the threat. In short, threat mitigation is a feedback loop.

**Failure**

 The future, when it arrives, is not always pleasant. Sometimes this results from faulty prediction. Predictions can be wrong because the prime narrative was incomplete—perhaps something was going on behind the scenes that was not sensed and, therefore, never was included in the prime narrative. Unpleasantness also can result from failure to mitigate threats. This can happen when the actions of other people or outside forces intervened at the last moment, before ongoing mitigation can be modified to address the changes. Or, it can happen if there is no way to mitigate predicted threats; either because it simply cannot be done or because the required competence is lacking.

**The Extended Future**

 The prime narrative’s causally implied, predicted, future is its glimpse of the future. And, just as the events in the predicted future will have been caused by what is happening now, those future events will cause even more events which will cause even more, and so on. In principle this could lead to an implied future reaching to infinity. But, in fact, each future has a time horizon, a functional end point where the causal implications become too diffuse, too unreliable to justify definitive action. On the other hand, research demonstrates that humans are capable of dealing with a far deeper future than any other animal.

**Other Animals**

 Although most creatures can predict the future to one degree or other, their time horizons are fairly short. For example, Kabadayi and Osvath (2017) describe their own and others’ research on animals’ ability to predict the future by studying their ability to plan ahead; which was measured by their ability to put aside resources for future use. Humans are best and next are the great apes. Apes are followed 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. Indeed, ravens are better at this than 4 year old children. The authors conclude that these animals, like humans, 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 (for related work with crows, see Taylor, Miller & Gray, 2012). However, even these skilled animals’ apprehension of that future appears to be limited to less than a day.

**Humans**

 Human superiority in appreciation of, and planning for, the future results is aided by our use of language, which gives us the ability to anticipate and mitigate both immediate and remote threats by addressing their present causes. This is because language has two important properties. First, by attaching labels to both actors and actions, to causes and effects, language enables us to both think about and talk about events that are remote in time and space. (And from here it is but a short step to abstract thought about actors 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, etc.) As a result, talking to ourselves and others takes over where the shallower, more immediate future afforded by causal inference from the past and present ends, thus extending the future into more remote time.

 To illustrate, consider the unique human understanding of what causes babies. That is, understanding the causal link between events that are separated by long time intervals as well as understanding how to deal with present causes to ensure the effects do or do not happen in the distant future. Dunsworth and Buchanan (2007) observe, “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* (emphasis added). 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 (not paginated).

**Derived Narratives**

**Thinking and Communicating**

 Not only does language serve to extend the predicted future, it also enables humans to communicate the content of the prime narrative to ourselves and others in the form of derived stories. By the time you became an adult, much of the content of your memory involved language, if only because you receive so much information from others through speech and writing. Communication requires that any portions of the prime narrative that are not in language must first be encoded in language. Most languages differentiate the past, present, and future and attach labels to actors and actions that increase specificity. As a result, encoding the prime narrative in language retains its narrative form (past, present, implied future).

 It is useful to classify derived narratives as narratives about experience, called *chronicle* *narratives*, and narratives about how to do things, called *procedural* *narratives*. (Beach, 2010; Beach, Bissell, & Wise, 2016; Gerrig, 1994). Chronicle narratives are what we tell ourselves (thinking) and others (communicating) about what is going on, how it came to be that way, what we expect to happen, and what the threats are. They also are the vehicle for extending the prime narrative’s immediate predicted future by elaborating it into a longer-term story of what might possibly happen in a week, a month, a year, or even longer (Section 5.0).

 Procedural narratives are as important as chronical narratives—there is no point in knowing what is going on and what will happen if you cannot do anything about it. Procedural narratives are the stepwise, detailed stories we tell ourselves and others about how to perform actions—they are the plans that guide action.

 Many procedural narratives come from your own experience, such as trial and error learning. Adding to, and building upon, these experience-based procedural narratives are the procedures you are taught by others—parents, peers, teachers, and society in general. Part of the genius of humanity is the collective, cultural elaboration of procedural narratives into science, religion, government, etc., all of which, one way or another, exist to mitigate threat.

 Procedural narratives are retained in memory as entire scripts, i.e., prescribed sequences of procedures for dealing with a particular species of threat, as well as separate procedures that link together to form new procedural narratives, new plans. The use of recipes in cooking illustrates this point: The general ability to cook requires acquisition of many of the skills (procedures) that are required by a variety of recipes. These skills are stored in procedural memory and retrieved as needed for a particular recipe. The recipe itself is a procedural sequence that is contained in two lists, required ingredients and required actions. The ingredients are tools and the required actions are the procedural narrative—the plan and its sequential steps that are required to produce the desired future dish. Each step calls upon one or more of those cooking skills that are stored away in procedural memory.

 Chronicle and procedural narratives exist to mitigate threats by changing our own and others’ behavior and by guiding manipulation of physical objects and abstract concepts. But, as a by-product, they also serve the other functions that were described in our opening paragraphs. Novels, TV, gossip are chronicle narratives that forestall unpleasant boredom but also are desirable as entertainment and instruction. Similarly, driving a car, building a bookcase, texting a friend require procedural narratives to reach desirable ends (i.e., to avoid not reaching them) but the action itself can be positive. Indeed, everything studied by social scientists derives from chronicle and procedural narratives, from their fundamental function in threat mitigation and from their being co-opted for broader purposes, such as education and entertainment. And both kinds of narratives reflect their origins by being temporally/causally structured as past, present, and future.

**Public Narratives**

 When a private chronicle or procedural narrative is shared with other people, it becomes a public narrative. Then it frequently becomes more involved and abstract as other people contribute to it, hone it, and apply it more broadly. In some cases, this is the end of it. But, in other cases, it becomes something very elegant—mathematics, the basic and applied sciences, the arts, and all the rest. Elegant public narratives are part of the human genius, and they all have their origins in the human ability to encode the prime narrative into language and communicate it to ourselves and others.

 Finally, lest we become too focused on written or spoken language, 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). Even so, words are a major part of it, the primary tool for expressing the multiplicity of narratives that underlie our social interactions and that help us know our world and ourselves through internal dialog. The key word in that last sentence is ‘tool,’ which is anything that helps us in our efforts to extend the future, identify threats, and formulate actions to deal with them before they overtake us.

**Some Implications**

 Although the theory I have presented focuses on the role that narratively structured experience plays in anticipating the future, in thought, and in communication, it has additional implications. The following are brief descriptions of some of these implications.

**Implication for Belief**

 The believability—plausibility—of any narrative, be it one’s own prime narrative, someone else’s novel, a newscast, or an ideology, is dependent upon how well it hangs together causally. Weak causal links make it difficult to identify threats because there is no strong thrust from past, through the present, to the predicted future. This, in turn, makes it difficult to instigate appropriate mitigating action, which increases the likelihood of unpleasant surprises. The result is uncertainty about the future and its threats, which creates anxiety, a negative emotion. Anxiety can prompt caution, sometimes to the point of standstill. It also can prompt action that will produce information making the prime narrative more coherent, and thus more plausible, reducing uncertainty about its implied future.

 Every culture supplies resources for increasing narrative plausibility and reducing anxiety about the future—shamans, priests, sages, healers. Many of these have evolved into the modern professions and monetized. Even so, they do what sources have always done. They provide causes (events) when none are apparent—malign forces, deities, nature, illness, repercussions of your own behavior, etc. They also explain how these causes are strongly linked to current discomfort and the prognosis for future discomfort. And, they prescribe action and tools for changing that prognosis.

**Implication for “I” and “Will”**

 We all have a strong sense of ‘I’ but some researchers argue that it is a social construct, shaped by what we and others tell us about who we are and what we are like (e,g, Kanagawa, Cross & Markus, 2001). Our discussion of narrative suggests two additional sources. First, you are the only constant in every version of your prime narrative and the narratives for thought and communication that derive from it—either as an active participant or as an interested observer. Second, determinism requires a cause for every event; things do not just happen. So, if an event has no other apparent cause, such as God, nature, luck, or someone else, ‘I’ is the default cause. Together, social construction, constant presence, and default produce a robust sense of self, of ‘I’.

 Just as we all have a strong sense of ‘I’, we all have a strong sense of agency or ‘will’; our actions occur because we ‘will’ them to happen. Indeed, if ‘I’ is the star of our private drama, ‘will’ is the producer and director.

 Recall that a threatening future prompts intervention which is guided by one or more procedural narratives. For immediate threats, this is fairly automatic, ‘will’ is not required. But, until you are told about it, you don’t have a chronicle narrative about automaticity so you lack an explanation for why you are doing what you are doing. Because everything has to have a cause, the default is to attribute it to your will to do it. ‘Will’, like ‘I’, is simply a way of supplying a cause when the real cause is too complicated or is not obvious.

**Implication for Reasoning**

 Many researchers think that human thinking as seriously flawed. This view results, in part, from the universal experience of making mistakes in reasoning. But it is reinforced by studies in which participants are presented carefully constructed reasoning and inference problems for which there are specific analytic tools to supply ‘correct’ answers—usually some aspect of statistics. Differences between participants’ answers and answers generated by the analytic tools are taken as evidence of flawed thinking.

 But there is a problem. The analytic tools that are used as criteria for ‘good’ thinking are culturally elaborated procedural narratives that would not exist if everyday thinking worked well on the tasks for which they are designed. Why design tools for tasks we can do easily without them? So, demonstrating that everyday thinking does not yield the same answer as the analytic tools is neither difficult nor surprising.

 In his book, *Thinking Fast and Slow*, Kahneman (2011), the most visible proponent of the ‘flawed thinking’ view, proposes that flaws imply two levels of reasoning, System 1(fast) and System 2 (slow). System 1 is the reasoning of everyday life, which is based on causality, and System 2 is deliberate, abstract reasoning, often relying on the logic and procedures of tools such as statistics. From this perspective, everything in this article prior to section 6.0 can be thought of as an explication of System 1 and everything in section 6.0, on derived narratives, is about System 2.

 Kahneman clearly regards System 2 as separate from and superior to System1 because it yields the ‘right’ answers. As he says, “... people are prone to apply causal thinking inappropriately, to situations that require statistical reasoning. Statistical thinking derives conclusions about individual cases from properties of categories and ensembles. Unfortunately, System 1 does not have the capability for this mode of reasoning: System 2 can learn to think statistically, but few people receive the necessary training” (p. 77). But if what we have been discussing is in fact System 1, it is a fast, efficient solution to the problem of anticipating and mitigating threats in a fundamentally unknowable future. Moreover, when we understand that statistics is a tool, a culturally elaborated derived narrative for solving problems that are beyond the capacity of causal reasoning, we do not really need a separate, superior, System 2—it is simply an adjunct to causal reasoning (section 6; Beach, 2009, 2011). Just as a hammer allows us to do tasks that we cannot do with our bare hands, statistics and other formal problem solving narratives allow us to do tasks that we as a culture have learned we cannot do using our natural, causal way of thinking. Rather than condemning the shortcomings of human reasoning, we should celebrate its ability to develop tools for remedying them.

**Implications for Change**

 Most people find it difficult to understand and accept change, particularly in the form of new ideas (unique events) that do not fit comfortably with their past experience. From the present viewpoint, the problem is that every event makes sense only because of its links to other events in memory. A truly new idea has nothing with which to link. Even if it were to have weak links to familiar events, their weakness would erode the prime narrative’s plausibility, arousing uncertainty/anxiety about the predicted future and its threats. Anxiety, a negative emotion, can most conveniently be mitigated dismissing the new idea as too removed from established truth to be credible. Or, it retained as a retread, a variation, of an already familiar idea and, therefore, not new and not disruptive. Reluctance to accept new ideas has the advantage of maintaining continuity, stability, and equanimity—the status quo—but at the price of lost opportunity for growth. The only way for growth to happen is to conditionally endure the discomfort until links are established and the new idea becomes a familiar idea.

 By contrast, most people are quick to accept ideas that fit with their old ones; known as the confirmation bias (Watson, 1960). Usually, ideas that fit easily are, in fact, not really new; their apparent newness lies in new or clearer links to old ideas The commentators on TV and the editorial pages of newspapers and magazines, for example, seldom provide new ideas but they strive to clarify or add causal links among old ones.

**Summary**

 I have tried to keep this discussion short to ensure that the basic idea is not buried in detail or side issues. Namely, avoidance of discomfort, even death, depends upon being able to anticipate threats and to act to eliminate or diminish them before they happen. My theory about how this might take place starts with sensory/emotional information about the environment being bundled with past experience in memory to create *events*.Temporally structured sequences of causally linked events are called *narratives* in which the causal implications of the past and present supply an implied future. The narrative about what is going on right now is called the *prime* *narrative* and its implied future is called the *predicted* *future*.

 For humans, the prime narrative’s predicted future is refined and extended by language. By attaching labels to both actors and actions (to causes and effects), language enables thinking and talking about events that are remote in time and space. Detection and mitigation of threats in the predicted future turns on the assumption that events that were emotionally negative in the past will be negative in the future. Therefore, when such events are part of the predicted future, mitigating action targets those events to prevent, avoid, or diminish their negative effects before they can occur.

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**Appendix: Deciding about Threat**

 At issue is whether the prime narrative’s predicted future contains threats, how threatening they are, and whether they make the future so threatening that intervention is required to prevent the threats (negative emotions) from materializing.

 *Working Assumption*: The predicted future is nonthreatening.

* The decision is about whether the preponderance of evidence invalidates the assumption.

 *Elements of the Model*:

* *Predicted future*: The causal/temporal sequence of events (**Ei = 1 to n**) in the prime narrative’s implied future.
* *Emotional Strength,* ***Ci***: The strength of the negative emotional component of a specific event **Ei** in the predicted future.
* *Event Standard,* ***Si***: The maximum acceptable strength of negative emotion, **Ci**, for event **Ei**.
* *Event Threat,* ***Ti***: An event, **Ei**, is threatening, **Ti** to the degree that the strength of its negative emotional component exceeds its standard, **Ci** - **Si**. If the strength is less than or equal to the standard, the event is not threatening and **Ti = 0**.
* *Future Standard,* ***Sf***: The maximum acceptable strength of overall negative emotion for the predicted future.
* *Future Threat,* ***Tf***: The threat posed by the predicted future is the sum of the threats (**Ci** - **Si)** of the individual events across all **n** of its events

 *Decision Rule:*

* When **Tf** > **Sf**, the threat posed by the predicted future is unacceptably large.

 As you can see, decisions about threats involve two thresholds. One is about whether the magnitude of the negative emotion associated with an event in the projected future is sufficient to make the event unacceptably threatening, ***Ti***. Exceeding this threshold identifies the event as a target for action to reduce or eliminate its threat. The other threshold is about whether the cumulative threat of its constituent events is sufficient to make the entire predicted future unacceptably threatening, ***Tf***. Exceeding this threshold prompts mitigating action. Note that a single, excessively negative event can be sufficient to make the entire predicted future threatening, but this state of terror usually requires more than one. Also note that both thresholds are idiosyncratic to the individual decision maker and contextual. Idiosyncratic in that different individuals have different general levels of tolerance for threat and contextual in that an individual’s tolerance is different in different circumstances—e.g., lower when you’re tired or have had a bad day.

 As you also can see, positive emotions play no role in the decision. This is not to say that positive emotions are unimportant, they are. It is just that they are irrelevant to the task of detecting threats and surviving in a dangerous world. It is non-compensatory; no amount of good can compensate for a significant amount of bad if the bad can kill you or even inflict much damage.

1. Beach (2010), Beach, Bissell, & Wise (2016), and Beach (2019). [↑](#footnote-ref-1)