disproved? Further, with regard to the claim that the most basic human motive is the desire for continued life, I have a number of questions. First, when a mother risks her life to save her child, what is the motive? Is kin selection the same as the life-preservation instinct? Where does prosocial behavior fit into the present model? Where does preserving one's genes fit in if it entails risking one's own life?

The role of groups is not well handled. Everything is from an individual motivational perspective. Perhaps it is to groups that we needed to look to understand, self-sacrificing acts as well as self-categorization processes. We may join groups to handle threats or opportunities that are beyond individual capabilities. For example, hunting large animals may require a group effort. More specifically, it appears that social support groups are often the most effective ways to manage terror. Similarly, people in a relationship live longer, and so forth. At this level, a fundamental problem with TMT it is that the view of human social motivation is not social enough. Indeed, the ultimate terror is to be socially disconnected and be unable to bridge that gap, as in autism and schizophrenia. Perhaps as Shotter (1983) commented about dispositions in general, terror management should be treated as in the "dance rather than the dancers" (p. 39).

Note

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Human Social Motivation in Evolutionary Perspective: Grounding Terror Management Theory

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"I don't want to achieve immortality through my work;
I want to achieve immortality through not dying."
—Woody Allen

Terror management theory (TMT) offers a fascinating perspective on human social motivation anchored in evolutionary theory. Just as theories of cosmology inconsistent with the modern laws of physics stand little chance of being correct, psychological theories inconsistent with modern evolutionary theory also stand little chance of being correct. With an evolutionary anchoring, adaptation and function become central. Medical researchers studying the liver would flounder without understanding the liver's toxin-filtering function. Understanding the psychological mechanisms that produce anxiety, self-esteem, and ingroup bias also requires functional analysis. Pyszczynski, Greenberg, and Solomon join evolutionary psychologists in emphasizing the need for a unifying framework that explains the functions of psychological motives (Buss, 1995a).

Despite my admiration for their efforts and for the fascinating empirical phenomena they have produced, TMT contains several core problems that require solutions to make it consistent with modern evolutionary theory and known empirical phenomena. The problems include:

1. TMT is anchored in an outmoded evolutionary biology that stresses survival, but ignores reproduction.
2. TMT appropriately stresses adaptation and function, but fails to delineate precisely how the hypothesized psychological mechanisms help humans solve actual adaptive problems of survival and reproduction, and instead focuses nearly exclusively inwardly on psychological protection.
3. TMT fails to consider why anxiety itself would have evolved.
4. TMT fails to account for known sex differences in social motivation, death rates, and the causes of death rates, whereas modern evolutionary psychological accounts successfully do so.

5. Empirical phenomena such as the pursuit of positive group identity, impression management, and persuasion may have important functions in solving human adaptive problems other than anxiety reduction.

6. A comprehensive theory of social motivation must include a wider array of known motivations, such as those involved in mating, parenting, reciprocal alliance formation, status striving, and kin altruism.

Is Terror Management Consistent With Modern Evolutionary Theory?

TMT is anchored in the evolutionary biology of "survival" or "self-preservation," which is presumed to be the "master motive" for all systems within the organism. Survival is important, and Pyszczynski et al. are surely correct that many human adaptations, such as thermal regulation, fear of heights, and avoidance of predators, have evolved by virtue of the survival benefits that they afford. It is now widely recognized, however, that reproduction, not survival, is the engine that drives the evolutionary process (Darwin, 1871; Hamilton, 1964; Williams, 1966). Survival is important from an evolutionary perspective only insofar as it promotes reproduction. Differential reproductive success, not differential survival success, is the causal process responsible for the evolution of whatever mechanisms we have as humans.

This fact is dramatically highlighted by mechanisms that actually lower survival but aid reproduction. The brilliant plumage of peacocks, for example, is understood as an adaptation that is costly to survival—it is energetically costly and acts as an open lure to predators—but it has evolved because it is a powerful attractor of mates (most likely because it signals excellent health), and hence aids reproduction. Mechanisms leading to competitive risk taking in men, to take another example, have evolved because they lead on average to higher status, greater resources, and hence more successful reproduction (see Wilson & Daly, 1985). Among humans, those men who failed to take certain kinds of risks also failed to acquire the resources needed for reproduction, failed to outcompete other men for access to desirable mates, and hence are not our ancestors (Buss, 1994). The fact that men die on average 7 years before women is stark testimony to the survival costs of competitive male strategies. Furthermore, an entire branch of evolutionary biology—senescence theory—is devoted to explaining the evolution of mechanisms that lead to premature death (Nesse & Williams, 1995; Williams, 1957).

Although Pyszczynski et al. may be onto something important and perhaps relatively neglected within mainstream psychology in their focus on survival, the drive for self-preservation cannot be viewed as the master motive of humans or any other organism. The postulation of survival as the master motive is inconsistent with what is now know about the evolution of all life.

Precisely Which Adaptive Problems Require Solutions?

Central to TMT is the invocation of "adaptation" and "function." Indeed, self-esteem, ingroup bias, impression management, and the control of others' worldviews are all proposed, sometimes explicitly and sometimes implicitly, to be adaptations, presumably leading people to rein in their terror of death, which otherwise might impede goal-directed activity. Although terms such as *adaptation* and *function* often are used informally by psychologists, who typically rely on intuitive understandings and definitions, Pyszczynski et al. are clear that they are using these terms in the sense meant by evolutionary scientists. The concept of adaptation has a precise meaning in evolutionary biology. It refers to a mechanism or organic structure that evolved precisely because it recurrently led its bearers to solve a specific problem of survival or reproduction over human evolutionary history (for a more extended definition of adaptation, see Tooby & Cosmides, 1992). All existing humans can be considered to be collections of adaptations—the end products (at this point in time) of this prior evolutionary process.

There are clearly established evidentiary standards for invoking adaptation, such as precision, complexity, reliability, economy, and efficiency (Tooby & Cosmides, 1992; Williams, 1966). And to their credit, Pyszczynski et al. do meet some of these standards, such as when they derive specific predictions about the contexts in which the psychological mechanisms involved in terror management will be activated. Nonetheless, a key criterion for invoking the concepts of adaptation and function is that the proposed mechanism must solve a specific problem of survival or reproduction. And it is on this point that TMT gets vague.

Rather than focusing on the nature of the adaptive problems whose solution is facilitated by terror management—such as acquiring food, combating predators and parasites, protecting the self against the hostile forces of nature, finding and attracting mates, raising children, detecting cheaters in social exchange, or helping kin—TMT proposes a veritable army of psychological mechanisms whose sole goal is to combat the terror of death. If so much psychological effort—the machinations of self-esteem, the manipulation of oth-

ers, the management of impressions, the solidification of social identity—are devoted solely to the psychological function of forestalling the terror of our own death, one must wonder when we can find the time and energy to solve all of the adaptive problems we need to solve in order to actually survive and reproduce.

I am not implying that psychological mechanisms whose function involves dealing with other aspects of our psychology (e.g., reducing anxiety) cannot evolve; clearly, there are such mechanisms. What I am saying is that all evolved mechanisms or adaptations, whether physiological or psychological, owe their existence to solving an actual problem of survival or reproduction. By orienting TMT so strongly toward anxiety regulation, the authors fail to make the crucial connections to actual adaptive problems that must be solved if the mechanisms they propose are to be considered adaptations. This failure to make connections with external adaptive problems deprives TMT of a wealth of potential understandings of the possible functions of anxiety, self-esteem, and other psychological phenomena.

Do Anxiety and Self-Esteem Have Functions Other Than Terror Management?

A central premise in TMT is that the evolution of human intellectual capacities brought about with it the unfortunate consequence of awareness of our own mortality. This awareness is presumed to cause "paralyzing terror," which renders goal-directed activity impossible unless it is subverted through psychological means. An unexamined premise in this theory is the origin of terror or anxiety itself. Precisely why awareness of death should provoke anxiety is unclear. Why wouldn't such awareness provoke a host of other phenomena, such as careful planning of one's life or a surge of hedonic sexual promiscuity? Presumably, we need an explanation for why such awareness would produce anxiety and not some other psychological state, but I could not discern in their article a rationale for this premise. Self-esteem is proposed as an evolved mechanism designed to protect us from anxiety, but a prior question is why we have anxiety-producing mechanisms to begin with.

If the distribution of fears and phobias is any indication, then human anxiety appears to be highly domain specific and tailored to particular adaptive problems. We tend to develop fears of snakes, spiders, darkness, heights, and strangers, all of which were presumably hazardous to our survival in human ancestral environments (Marks, 1587). Moreover, anxiety about social exclusion may have specific survival functions, such as ensuring the protection and resources of the group and reproductive functions such as ensuring access to potential mates (Buss, 1990). Thus anxiety, rather than being a byproduct of our greater cognitive capabilities leading to awareness of death, seems tailored, at least in part, to the solution of *specific* problems of survival and reproduction.

Furthermore, self-esteem also seems uniquely tailored to solving specific adaptive problems. The fact that self-esteem rises when we gain access to reproductively relevant resources (e.g., job promotions, status elevation, new mates) and falls when we lose such resources suggests functions of self-esteem other than the warding off of terror of mortality. By focusing so heavily on controlling internal anxiety, TMT ignores the other adaptive problems for which fears, phobias, and self-esteem might play a functional role.

Can a Theory of Social Motivation Ignore Sex Differences?

An abundance of psychological data suggests important sex differences in many of the domains touched on by TMT. These include sex differences in mortality itself (men die on average 7 years earlier than women), the sorts of risk-taking behaviors that lead to death, the importance of being liked by members of the group, the need for intimacy, the importance of status as a social motive, the amount of anxiety experienced, and the bases of self-esteem (see, e.g., Buss, 1995b; Eagly, 1995; Hoyenga & Hoyenga, 1993). At this point in the history of psychology, no theory of social motivation can afford to ignore these profound and well-documented sex differences.

There are powerful evolutionary psychological theories that can account for these sex differences in social motivation (Buss, 1994). Much evidence, for example, supports the theory that the earlier death of men from disease, stress, trauma, and murder is due to their lower levels of parental investment, which leads to a higher reproductive potential, greater intrasexual competition, and hence a strategy that involves higher risk taking. Presumably, a strategy of greater risk taking enabled ancestral men, on average, to best other men in intrasexual competition, but it comes at a cost of higher mortality, just as the peacock's brilliant plumage hinders survival but increases reproductive success. The key point is that TMT, like any grand theory of social motivation, must account for known facts about these key sex differences in motivational mechanisms.

Is Persuasion Primarily Focused on Anxiety Reduction?

Pyszczynski et al. deserve credit for having uncovered some fascinating empirical phenomena, such as the finding that reminders of death lead to more favorable evaluations of the ingroup and more negative evaluations of the outgroup. However, it strains credulity to imagine that all these phenomena, including efforts to persuade others, cultivate a social reputation, bolster self-esteem, manage impressions, and pursue cognitive consistency all could have evolved specifically and solely for the purpose of reducing anxiety about death.

Even if we accept the premise that elevated intellect created the horror of one's own death and that selection would favor the amelioration of interfering anxiety, it seems reasonable to assume that selection could have forged a simpler solution to this adaptive problem than the evolution of a half dozen or more complex, costly, and cumbersome psychological mechanisms. Furthermore, humans have to solve dozens of adaptive social problems, such as selecting, attracting, and retaining mates; forging coalitions; protecting families; negotiating hierarchies; forming reciprocal alliances; detecting cheaters; combating competitors; socializing children; investing in kin; and negotiating kin conflicts. Given these numerous and diverse adaptive challenges, would selection favor the evolution of so many mechanisms for the single problem of reducing anxiety? Where in the proffered "unified theory of social motivation" are solutions to these other important adaptive problems?

Moreover, there is enough empirical evidence to suggest that phenomena such as persuasion and impression management are channeled toward adaptive goals that cannot be accounted for solely, or even plausibly, by the motive of reducing death anxiety. Persuasion attempts in everyday life are oriented toward making money (Cialdini, 1994), derogating competitors (Buss & Dedden, 1990), negotiating hierarchies (Kyl-Heku, 1989), deceiving others (Tooke & Camire, 1991), attracting sex partners (Greer & Buss, 1994), dissuading mates from infidelity (Daly, Wilson, & Weghorst, 1992), enforcing cooperation (Axelrod, 1984), maintaining social reputation (Nisbett, 1993), and dozens of others goals. These social motives, toward which persuasion attempts are directed, require functional analysis in their own terms, not merely as subserving anxiety reduction.

Toward a Comprehensive Theory of Social Motivation

Pyszczynski et al. provide a theory with admirable features not contained in most mainstream theories in social psychology. Among the virtues of their approach are their attempts to ground psychological theory in evolutionary understandings, to highlight the centrality of adaptation and function, and to emphasize the need for a unifying framework for explaining psychological motives. Their theory also has led to some important empirical discoveries.

Despite the attractive properties, a comprehensive theory of social motivation cannot be achieved by focusing solely on survival, because survival is logically secondary to reproduction as the engine of evolution. It cannot be achieved by focusing on one adaptive problem to the exclusion of others. It cannot be achieved by ignoring what is now known about sex differences in survival, sexuality, and sociality. And it cannot be achieved by focusing on internal psychological needs to the exclusion of dozens of social adaptive problems that require solution.

But TMT does serve a useful purpose in broadening our thinking to consider functional levels of analysis typically ignored in mainstream social psychology. Although it does not fulfill the promise of providing a unified theory of social motivation, it contains several of the necessary ingredients for the eventual development of one.

Note

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Unresolved Issues With Terror Management Theory

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The central premise of terror management theory (TMT)—that people are distressed by thoughts of death—might seem so obvious and commonsensical as to be nearly useless. Yet, according to Pyszczynski, Greenberg, and Solomon, the implications of this simple assumption go far beyond the obvious to inform us regarding a fundamental motive that accounts for a great deal of human behavior. Although their earlier writings used TMT to explain the functions of the self-esteem motive, Pyszczynski et al. have extended the purview of the theory to encompass much of the content of social psychology. In our commentary, we examine logical problems with TMT, critically evaluate the empirical evidence offered to support it, and then discuss what we see as the merits of this controversial approach.

Logical Issues

According to Pyszczynski et al., TMT "requires only one commonly accepted and rather noncontroversial a priori assumption: specifically, that living organisms are oriented toward self-preservation." In linking their theory so directly to self-preservation, they seem to root it on unshakable ground. In fact, the theory does not follow directly from this admittedly noncontroversial assumption. The direct implication of the assumption that organisms are oriented toward self-preservation is that they will behave naturally in ways that increase their likelihood of survival. One logical difficulty with TMT is that the authors have not made a strong case that terror management processes increase the organisms' chances of survival. It simply does not follow that a motive for self-preservation will lead organisms to minimize the perceived severity of threats to their survival as the theory suggests.

In fact, we suggest that a terror-management mechanism that ostensibly reduces an organism's concerns about death would likely *decrease* its long-term viability. According to most theorists, the propensity for experiencing anxiety evolved, as did most emotions, because it promoted survival. To oversimplify only slightly, anxiety promotes the organism's well-being because it deters behaviors that place the organism at excessive risk and it tends to stop ongoing behavior to allow a reassessment of potential danger in a situation (Fridja, 1986). Thus, an organism that possessed a system for automatically reducing mortality concerns before they reached awareness would be at considerable risk for behaving in ways that were detrimental to its well-being.

Pyszczynski et al.'s claim that fundamental psychological motives evolved because they facilitated survival and reproduction is an exceptionally important one (see Barkow, Cosmides, & Tooby, 1992). However, if the capacity for anxiety promotes welfare and survival, we find it difficult to understand the process by which humans would have evolved a mechanism that buffers them against such feelings. Specifically, what evolutionary process would lead people to be less afraid of death than they would (or should) otherwise be? Such a mechanism seemingly would decrease the organism's chances of survival.

TMT anticipates this objection. According to Pyszczynski et al., "knowledge of the inevitability of death gives rise to the potential for paralyzing terror, which would make continued goal-directed behavior