
Creative Cognition, Conceptual Combination, and the Creative Writing of Stephen R. Donaldson

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This article explores the reported use of conceptual combination in Stephen R. Donaldson's development of the idea for his award-winning fantasy series, The Chronicles of Thomas Covenant the Unbeliever. Donaldson's (1991) own account is used to illustrate the general principles of a creative cognition approach to understanding creativity as well as the more specific role of the basic process of conceptual combination. The links between Donaldson's and others' anecdotal accounts of creativity and laboratory investigations are assessed. The article concludes with an argument for a "convergence" approach in which information from anecdotal accounts and laboratory studies is combined to provide a more complete picture of creative functioning than either approach alone can offer.

As soon as those two ideas came together, my brain took fire.
—Stephen R. Donaldson (1991, p. 223)

In 1977, Stephen R. Donaldson published *Lord Foul's Bane*, the first book in what would become the double trilogy, *The Chronicles of Thomas Covenant the Unbeliever*. It became a national best-seller, as did the subsequent books in the series, and it garnered Donaldson the John W. Campbell Award as the best new writer in 1979. The series has come to be regarded as a classic work of "high fantasy" and has been compared favorably with other notable works of fantasy, such as J. R. R. Tolkien's *Lord of the Rings* and C. S. Lewis's *Narnia* series. By standards in the field, then, *Thomas Covenant* represents a major creative accomplishment.

I have chosen to focus on this work of fantasy because Donaldson (1991) provided a clear statement about the origins of the idea for the series and because his statement helps to illustrate important aspects of the creative cognition approach to studying creativity (see, e.g., Finke, Ward, & Smith, 1992). In this article, I sketch the outlines of a creative cognition view and then consider the implications of Donaldson's statement for that view.

The creative cognition approach concentrates primarily on the cognitive processes and conceptual structures that produce creative ideas. Its complementary goals are to use empirical and theoretical advances from cognitive science to aid in understanding creativity and to use creative performance as a way of learning more about basic cognitive processes. Given that the capacity to generate novel thoughts is one of the most salient aspects of the human mind, it is somewhat surprising that mainstream cognitive psychology has not been more influenced by Guilford's

(1950) seminal work. The creative cognition approach seeks to provide an additional impetus to basic cognitive investigations of creativity. The approach does not deny the crucial importance of other "noncognitive" factors, such as motivation, personality traits, formal education, mentoring, and other social and historical forces (see, e.g., Amabile, 1983; Csikszentmihalyi, 1999; Simonton, 1999; Sternberg & Lubart, 1995), but as a practical matter, it focuses on the more limited domain of the cognitive processes that generate the novel and useful ideas that form the basis of creative advances. Put differently, those other factors clearly must influence the likelihood and intensity with which individuals engage in particular cognitive operations, the information available to a creator, and the likelihood that a newly generated idea will be deemed acceptable. Consequently, a complete account of human creativity will require a specification of the interplay of such factors. However, just as certainly, our understanding of creativity cannot be complete without a detailed and rigorous treatment of the cognitive processes from which novel ideas emerge and through which the creative potential of those ideas is recognized (see, e.g., Finke et al., 1992; Runco & Chand, 1995).

A general descriptive framework for creative cognition is the Geneplore model (Finke et al., 1992), which characterizes the development of novel and useful ideas as resulting from an interplay between generative processes that produce candidate ideas of varying degrees of creative potential and exploratory processes that expand on that potential. Rather than focusing on the creative process as a singular entity, the model identifies a cluster of basic cognitive processes, which combine in a variety of ways to influence the probability of a creative outcome.

The generative processes that have been identified include retrieval of various types of information, such as specific category exemplars, general conceptual knowledge, images, source analogs, and so on, as well as association and combining of concepts and images. These pro-

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cesses are assumed to result in candidate ideas, sometimes referred to as *preinventive forms*, that are not necessarily complete creative solutions to the problem at hand, but rather represent possible starting points that can either facilitate or inhibit creative outcomes. Among the properties that could be evident for these candidate starting points are their apparent novelty, surprisingness, aesthetic appeal, or other factors that would influence the creative person's perception that they hold promise for solving the current problem. The model assumes that people can use such properties to determine which preinventive forms should be retained for further processing. The creative potential of selected ideas is then developed by way of other specific exploratory processes that modify, elaborate, consider the implications, assess the limitations, or otherwise transform the candidate ideas. Finally, the model assumes that real-world constraints, such as the availability of resources and the social acceptability of particular ideas, can influence the form of initially generated ideas, the person's judgment about which ideas to explore, or the way in which a candidate idea is modified through exploratory processes.

An important feature of the creative cognition approach is the specificity with which it characterizes both the nature of basic cognitive processes and how they operate on knowledge structures to produce ideas. For example, rather than relying solely on global cognitive descriptors, such as "divergent thinking," a creative cognition approach seeks to specify the basic component processes that lead to divergent productions, such as retrieval, combination, analogy, transformation, and so on. At a still more specific level, creative cognition attempts to identify the detailed operation of those component processes. For example, although an individual might produce a divergent idea by way of analogy to some other knowledge domain, analogy itself is just a global descriptor for more fundamental processes such as alignment, retrieval, mapping, and projection of information from a source to a target domain (see, e.g., Gentner, 1989). Only by way of this fine-grained assessment of basic cognitive processes will it be possible to move beyond global characterizations of how people produce novel and useful ideas.

Of the generative component processes considered within the Geneplore framework, the one most directly related to the Thomas Covenant series is conceptual combination, by which previously separate concepts are merged to form new units that can differ in important ways from either of their constituent concepts. Donaldson's (1991) account of the origins of that tale reveals three important ingredients consistent with a Geneplore framework: a specific generative process leading to a candidate idea, the creative person noticing the potential in the idea, and the use of exploratory processes to bring that potential to fruition. He stated that, from as early as 1969, he wanted to write a story dealing with the concept of "unbelief," a rejection of fantasy, but that the idea remained dormant until May 1972. At that time, he realized that his "unbeliever" should have the disease of leprosy. As noted in the opening quote of this article, when Donaldson combined the concepts of unbelief and leprosy, his "brain took fire."

That is, he sensed the enormous creative potential in the combination and began to explore it. During the years between 1969 and 1972, Donaldson clearly entertained many other possible ways of instantiating the concept of unbelief, but "no matter how [he] labored over it, [he] couldn't make it grow" (Donaldson, 1991, p. 223). He sensed a potential in the combination that had been missing from any other ideas he had entertained previously.

Readers can be forgiven if the leprosy-unbelief combination does not immediately cause their brains to catch fire, but the reason that it did cause Donaldson's to do so also illustrates something very important about the role of knowledge in creativity. Donaldson had extensive personal knowledge of the experiences of people who had the disease, having grown up in India, where his father worked to help them. Donaldson knew that leprosy, or more properly Hansen's disease, attacks peripheral nerves, with the consequence that people can lose sensation in their appendages. Without sensation, the withdrawal reflex that can limit the extent of injuries from sharp or hot objects is reduced. People can sustain serious wounds and develop severe infections without experiencing the pain that would signal the injury, and the result can be deformation or amputation of the affected area. Consequently, it is crucial for such individuals to remain extremely vigilant and constantly monitor themselves for the presence of injuries. The potential that Donaldson saw in the initial combination was the excruciating conflict between the need for constant vigilance to safeguard one's existence and the desire to escape into a fantasy world that might provide a satisfying, though potentially illusory, release from the disease.

That potential is realized in the tale of the painfully conflicted protagonist, Thomas Covenant, who is afflicted with Hansen's disease in the real world but who fears the escape that may be available to him in a fantasy world. In his real world, Covenant is shunned, his wife has left him, and he has lost two fingers from his right hand to an unfelt infection. To help himself to avoid the prospect of future amputations, Covenant has developed a rigid discipline of regularly surveying his extremities for injuries. In the fantasy world, where he awakes after blacking out in front of an approaching car, he is welcomed as a legendary hero, Berek Halfhand, and he encounters a substance called hurtloam that seems to cure his disease. The dynamic tension between the attractions of the fantasy world and Covenant's fear of neglecting the discipline that has kept him well sets the stage for a remarkably compelling story.

According to Donaldson's statement, then, the combination of the concepts of unbelief and leprosy produced an emergent outcome that went well beyond the properties of either concept in isolation. However, the reputed power of combined concepts to foster creativity is not unique to the Thomas Covenant story. Indeed, Donaldson (1991) noted more generally that "a fair number of my best stories arise, not from one idea, but from two" (p. 222). In addition, creative ideas, inspiration, and discoveries in art, literature, music, science, technology, and business are often attributed to mentally merging otherwise separate or discrepant concepts (see, e.g., Rothenberg, 1979; Thagard,

1984, 1988; Ward, Finke, & Smith, 1995), and the process figures prominently in a number of models concerned with various aspects of creative functioning (see, e.g., Costello & Keane, 2000; Davidson, 1995; Mobley, Doares, & Mumford, 1992; Mumford, Baughman, Maher, Costanza, & Supinski, 1997; Sternberg & Lubart, 1995).

It is important that for a creative cognition approach, there are laboratory studies that also demonstrate, if on a somewhat more mundane level, that new properties can arise from combined concepts (see, e.g., Hampton, 1997; Hastie, Schroeder, & Weber, 1990; Kunda, Miller, & Claire, 1990). For instance, Kunda et al. (1990) had participants in their study describe target individuals who were members of somewhat "surprising" combined categories (e.g., a Harvard-educated carpenter) and found that those descriptions contained novel emergent properties that were not present in descriptions of individuals from the separate categories (e.g., a Harvard-educated person or a carpenter). Harvard-educated carpenters, for example, were described as nonmaterialistic, whereas Harvard-educated people or carpenters were not. Kunda et al. suggested that the surprisingness of the combinations led people to engage in causal reasoning to try to explain how a person might be in two otherwise discrepant categories, and it may be that a similar type of reasoning underlies the development of creative ideas in real-world settings.

An implication of Kunda et al.'s (1990) research is that people sensed the surprisingness of the combinations, which then triggered causal reasoning. This finding coincides nicely with Donaldson's (1991) account of realizing the creative potential in the unbelief-leprosy combination, and both Kunda et al.'s view and Donaldson's statement illustrate the assumption of the Geneplore model that the perceived properties of initial candidate ideas can provoke additional exploratory processing.

Laboratory work and cognitive theorizing also provide an account of how a person might notice the potential of a combination. Wisniewski (1997a, 1997b), for example, proposed that at least some combinations are interpreted by way of a comparison and construction process, in which people align the properties of the two concepts, note the commonalities and differences in those properties, and then attempt to instantiate some version of a property of one concept in the representation of the other. For instance, when confronted with the novel combination "zebra horse," people might align the properties of "zebra" and "horse," note the difference of stripes versus no stripes, and instantiate some version of the zebra's stripes in the horse concept.

The comparison-alignment process can lead to the sense of surprisingness by identifying conflicting properties in the structure of the combined concepts. For example, aligning the stereotypic occupational requirements of Harvard-educated persons versus carpenters might reveal conflicting expectations (e.g., intellectual effort vs. physical dexterity and strength) and lead people to try to account for that discrepancy. Likewise, the alignable conflict between the need for and the fear of escape into a fantasy

world may underlie some of Donaldson's realization of the potential in combining unbelief and leprosy.

Donaldson (1991) also noted that unbelief and leprosy were different sorts of concepts, with the former being "exotic" and the latter being "familiar" (at least to Donaldson). This characterization of the concepts highlights a general view, inherent in anecdotal-historical accounts, that discrepant or dissimilar concepts are particularly laden with creative potential. Indeed, some have argued that Janusian thinking, or the simultaneous consideration of completely opposing concepts, underlies creative functioning in a variety of fields (see, e.g., Rothenberg, 1979).

Once again, such statements have a counterpart in laboratory-based cognitive investigations showing that the more incongruent the components of a combination are, the more the combination results in emergent properties (see, e.g., Estes & Ward, in press; Hampton, 1997; Hastie et al., 1990; Wilkenfeld & Ward, in press). In the extreme, having people consider completely imaginary conjunctions (e.g., furniture that is also fruit) leads to a large number of emergent properties (Hampton, 1997). An alignment process, as suggested by Wisniewski (1997a, 1997b), presumably allows people to detect conflicts (e.g., between the durability of furniture and the perishability of fruit), which leads them to apply reasoning to resolve the conflicts (e.g., attributing self-regeneration to the fruit furniture). Importantly, because the participants in these studies were ordinary college students, the work highlights the idea that conceptual combination is a basic cognitive operation, well within the cognitive repertoire of most people. Although it can underlie striking creative accomplishments, it is not the sole province of creative geniuses.

Creative cognition more generally assumes that basic processes, such as conceptual combination, support a range of generative outcomes, from the mundane nonperishability of fruit furniture to the exquisitely conflicted unbelief of Thomas Covenant. What differentiates the mundane from the extraordinary? Three important contributing factors are the richness of the person's conceptual structures, the sensitivity to properties that give some candidate ideas more potential than others, and the amount and type of effort devoted to exploratory processes.

Competing models propose different mechanisms by which a person's knowledge has its effect (see, e.g., Costello & Keane, 2000; Wisniewski, 1997a, 1997b), but they share the view that stored information about component concepts influences the form of an interpretation and the novel properties that emerge from a combination. Furthermore, because the creative cognition approach views creativity as arising from cognitive processes applied to existing cognitive structures, it follows that, in general, the creativity of an outcome will be positively related to the extent of an individual's domain knowledge (see, e.g., Weisberg, 1999). Donaldson clearly had an intimate and extensive knowledge of Hansen's disease, and that knowledge seems to have allowed him to see the potential in an unbelieving leper and to exploit it to its fullest.

In addition, because the Geneplore model emphasizes the possibility of multiple cycles of generation and explo-

ration, it implies that more extensive work will bring out more of the creative potential in a combination. Donaldson's statement is particularly informative in this regard. After noting that his brain caught fire, he went on to state that "I spent the next three months feverishly taking notes, drawing maps, envisioning characters, studying the implications of unbelief and leprosy" (Donaldson, 1991, p. 223). In Geneplore terms, Donaldson engaged in the exploratory processes of elaboration, image manipulation, and consideration of the implications of the initial candidate idea. Without that effort, the potential he sensed in the combination would not have been realized.

It is important, however, that knowledge and effort should be viewed as necessary, but not sufficient. It is clear that many knowledgeable hard workers do not produce high-quality, creatively emergent outcomes. Thus, it may be that effort devoted to particular processes is more critical than the total amount of effort per se. Donaldson reasoned extensively about the conflict between the opposing needs for vigilance and escape, which corresponds well to suggestions that novel properties emerge from logical reasoning directed at resolving conflicts between opposing properties (see, e.g., Hampton, 1997; Kunda et al., 1990). In a similar manner, Dunbar (1997) highlighted the exploratory reasoning of scientists attempting to explain unexpected or conflicting findings. Thus, although hard work in itself may not be critical, a willingness to entertain contradictory properties and to engage in effortful reasoning to resolve those discrepancies may be.

Donaldson's (1991) statement about exploring the implications of the initial idea also identifies an important challenge for cognitive theorists. Much research and theorizing about conceptual combination has emphasized the initial interpretation of combined concepts. This makes sense, because the focus has been on the difficult problem of explaining text and spoken language comprehension. However, to understand the generative capacity inherent in conceptual combination, theoretical frameworks will need to be developed to address how people move beyond initial interpretations to bring the creative potential in a combination to fruition.

A Convergence Approach

Implicit in this article is the idea that important advances in understanding creativity can come from a "convergence" approach. In that approach, anecdotes regarding extraordinary creative achievements are analyzed to identify candidate processes, operational definitions of those processes are developed to bring the phenomenon into the laboratory, and controlled experiments are conducted to assess the generative potential of the process.

Combining anecdotes and laboratory studies helps to overcome the shortcomings of either approach alone. Anecdotes about the use of a particular process are suggestive of their importance to meaningful real-world accomplishments but fail to document a causal link between the process and the accomplishment. They suffer from what Ward et al. (1995) called the "compared to what" problem. Even if the creative individual's introspection is correct in

identifying the source of a creative idea, it does not necessarily follow that the identified process is the best one for producing creative outcomes. There is no way to know whether some other process might have resulted in a more creative idea over a shorter period of time.

Laboratory studies can be more effective in establishing causal connections between processes and outcomes, but they have their own limitations. They may create entirely artificial situations and assess processes with little real-world validity. However, by trying to operationalize processes that match the ones described by creative individuals, laboratory studies have a better chance of assessing the processes that might matter to real-world creativity. Thus, through the use of a convergence across anecdotal and laboratory procedures, more compelling information can be obtained about the cognitive underpinnings of creative accomplishment.

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