

Reference: Kaufman, S.B. (2006-2007). Review of *Creativity from Constraints: The Psychology of Breakthrough* by Patricia D. Stokes. *Imagination, Cognition, and Personality*, 26, 273-278.

I recently began a workout program to lose some fat and restore the six pack abdomens I never had. One of the main tenets of the program is variability in the type of workout I do. Apparently, muscles bore easily. If you do the same workout day in and day out, eventually improvements will be hard to come by. If you do too many different types of workouts at too high a level of intensity, you exceed your optimal heart rate “zone”, and also will find little improvement. The program I am on emphasizes variability with constraints. In order to achieve this, I had to first learn the different machines, weights, and aerobic exercises available to me and how each works. Then, I have to vary the machines I use each workout, and achieve an optimal heart rate while I’m working out. So far, I’ve been pleased with the program, and even though I’ve just begun, I can already feel the six packs slowly coming into fruition.

Now what could this seemingly irrelevant introductory paragraph have anything to do with the current book under review? It seems quite a lot. After reading *Creativity from Constraints*, the analogy seemed apt. Muscles apparently are a lot like the psychology of the individuals who have those muscles. In other words, human creativity involves variability— different ways of doing things, and also involve constraints, which can either promote or preclude creativity. This insight is the basis of Patricia Stokes’s book, and through an impressive array of examples, it is clear that constraints play a role in many different creative domains, and in many of the most revolutionary creative products of our time.

Why constraints? In chapter 1, Stokes poses what she refers to as “The Creativity Problem”. In many domains, there are issues that have not yet been resolved, questions that have not yet been posed, and problems that have no obvious solution. These ill-structured problems require a creative approach. Paradoxically, when people are given free reign to solve a problem, they tend to be wholly uncreative, focusing on what’s worked best in the past. According to Stokes, such freedom can hinder solving the creativity problem, whereas the strategic use of constraints can promote solving the creativity problem. By using constraints, reliable responses are precluded and novel surprising ones are encouraged.

What are some of these constraints? In chapter 2, Stokes describes the various constraints that help structure the creativity problem. Some constraints promote creativity, whereas others promote conformity. Responses that are applied in an almost algorithmic fashion (e.g., rote memorization of ideas in school, copying correctly, etc.) promote conformity. Stokes conceptualizes constraints for creativity as coming in pairs. One constraint precludes low-variability, tried-and-true responses, while at the same time promoting high variability, novel responses—the type that leads to creative breakthroughs.

Stokes lists four such constraints. The first set of constraint she mentions are domain constraints. She refers to these specifically as “First Choruses. Individuals in any field will have a difficult time being creative unless they first become an expert in the field. This requires learning all of the agreed-upon performance criteria of the field. These criteria are based on what Stokes refers to as *goal*, *subject*, and *task* constraints. Goal constraints specify a particular style, subject constraints involve content, and task constraints refer to the particular materials that are used in a domain. Put simply: domain constraints provide the structure, the foundation if you will, upon

which experts can then produce variations. According to Stokes, the transition from master to creator comes when the expert imposes novel constraints on their domains.

The second set of constraints Stokes refers to are cognitive constraints. These reflect the limitations of the human mind. Many creative works are overlooked simply because they are not understood. The creator needs to keep in mind the fact that humans can process only so much information and do so in certain associative ways. Experts themselves overcome cognitive limitations via the actual process of becoming an expert— they organize their information into chunks.

The third set of constraints Stokes points to are variability constraints. These specify how differently something must or should be done. According to Stokes, people learn these constraints very early during expertise acquisition. Every time an individual learns a new skill, they learn not only domain-specific skills but also how differently they can apply those skills. What affects these learned variability levels? According to Stokes, early feedback that rewards novelty is crucial for maintaining high learned variability levels. If the task is easy, the individual won't see the need to try many things to solve the problem. If the task is challenging, however, the individual tries different ways of solving the problem. This then leads to praise for their creative way of solving the problem, which then leads to motivation for more creativity.

The fourth set of constraints Stokes mentions are talent constraints. These involve innate talents that Stokes believes are genetic. Although I disagree here with her strong words that “you either have them or you don't” (p. 11), she is certainly correct that each domain requires a constellation of special talents and abilities, and the lack of such abilities will constrain your ability to achieve in that domain, and the existence of such abilities will promote your ability to achieve in that domain.

With these four constraints in mind, chapters 2-8 each focuses on a different domain and illustrates how constraints play a role in that domain. Each of these chapters also includes an interview with an expert in the field that describes how constraints personally play a role in their work. The domains that are included are literature, art, fashion, architecture, advertising, and music. Stokes does a fine job in these chapters of illustrating how different constraints play a role depending on the domain in question, and the goal, subject, and task constraints that are associated with that domain and the individual creator. For instance, the chapter on literature illustrates how Proust, Kundera, and Calvino all considered, each in their own way, the subject constraint of memory and how this consideration led to task constraints that precluded the traditional structure of novels and promoted creativity.

In chapter 9, Stokes discusses how constraints can structure the creativity problem *in general*. Stokes argues that almost anyone is capable of developing their creativity. She mentions the fact that most children are extraordinarily creative, and can make things that are new and even generative. She outlines here four constraints that affect the path from childhood giftedness to eminent creation in a field. The first is the domain constraint. This initial constraint determines what field the child will invest their time and energy. Usually, this is chosen by the child based on early success and intense interest. Once the domain or area of knowledge is chosen, this then precludes other possible domains in which the child can become an expert.

The second constraint Stokes mentions in chapter 9 is the variability constraint. Children often don't learn to be highly variable in a domain because their early experiences in the domain are not challenging enough. Stokes cites the benefit of accelerated learning for acquiring what Stokes refers to as *habitual variability levels* (i.e., the habit of being variable). Students who receive a challenging or accelerated

education learn to do many different and new things, promoting both mastery and high variability at the same time. Mastery then leads to reward, which further encourages the student to be creative. Stokes believes that highly creative individuals are comfortable being highly variable.

The third constraint that affects the path from giftedness to genius consists of early task constraints. Stokes believes that different constraints come into play at different stages of the talent development process. At the first stage, initial exposure to a domain should be playful and teachers should reward merely the involvement in a domain of inquiry. It is at this stage that the individual learns persistence and industriousness—important factors for the next stage. The next stage is the apprenticeship stage, where the child focuses on precision over playfulness. In this stage, the child learns technical competence and constructive criticism on the part of the teacher replaces unconditional praise.

The fourth constraint involves the goals of the creator, and only comes into play once mastery of the domain is achieved. Here is where the path diverges according to Stokes. One fork leads to the reliability of the expert, where the other leads to the unpredictability of the creator. According to Stokes, the path the individual takes most likely depends on their early experiences in a domain, and their use of novel goal constraints.

In Chapter 10—the final chapter of the book—Stokes recaps what has been learned throughout the book, emphasizing that constraints usually come in pairs, are hierarchically organized, and are specific to domains. Finally, she includes an appendix full of exercises that incorporate constraints for promoting creativity.

All in all, this book was a refreshing read, and quite unique in the creativity literature. Partly this is due to the background of Stokes, who started out in art and

advertising, before entering a career in Psychology later in life. Many examples draw upon her artistic experiences and unique point of view.

The book also touches on a wide scope of issues which many creativity and giftedness researchers are currently trying to tackle (Kaufman & Sternberg, in press). One of these issues involves the transition from giftedness to genius, or put another way, the path from childhood giftedness to adult giftedness. This book suggests that there are various constraints, each step of the way, which impact this transition. By delineating these constraints, Stokes offers new insight which could be incorporated into new models of giftedness, and child development. An important take-home message of the book is that children learn early on to be creative. The implications for education are significant—suggesting that emphasis in the schools should be more on challenging *all* students, and teaching students to embrace and appreciate novelty, than a focus on coming up with the *one* correct answer.

The book is not without its flaws, of course. I found the writing a bit hard to follow at times, especially the sections describing in detail the different domains. This is not entirely Stokes's fault. In order to illustrate many of her principles, she was required to go into detail some domain elements which normally require much expertise to comprehend. For instance, when I was in music school as an undergraduate, it took me an entire semester to (still only vaguely) understand Schoenberg's "12-tone system" in music composition. Stokes describes the scale in just a few paragraphs.

It is also a shame that the artwork included in the book couldn't have been printed in color. Again, this is most likely not the fault of Stokes, but of the publisher and publishing costs. Nonetheless, there are instances when the figures could have been used more effectively to illustrate a particular point if they were printed in all of

their splendid color. For instance, in Chapter 4, “Creativity for Creativity in Art”, Stokes tries to illustrate in Figure 4.1 how Monet constrains the separateness of colors. In the text, she describes how “The pale lavenders, blues, greens, and yellows are very close in value (p. 36).” It is clear that Stokes put a good deal of work into drawing the figures, and attempting to illustrate her points with those figures, which is why it is a shame that her illustrations couldn’t have achieved their maximal effect.

Another flaw is Stokes’s omission of theories and research that are related to her ideas. It is, of course, unnecessary to include a full review of the creativity literature. Nonetheless, it would have been nice to see reference to the work done on the role of constraint in creativity by creative cognition researchers (Finke, et. al, 1992), as well as a brief description of Margaret Boden’s ideas regarding the role of constraint in creativity (Boden, 1992). Stokes includes such references in her peer-reviewed journal article (Stokes, 2001), but it would have been appropriate to include such references in the current book as well. Even the mention of Csikszentmihalyi’s (1996) systems model of creativity would have been appropriate.

Even with its minor flaws, *Creativity from constraints* is a well thought out book and a fresh look at creativity. Its inclusion of such a wide range of domains makes it appropriate to creativity researchers as well as practicing artists and creators in any domain. The practical exercises in the Appendix, and the ideas presented in the main text could be quite useful to just about anyone who wishes to stand out from the crowd (in a novel *and* useful way, of course). Possibly, the reader of this book will, like I did with muscles, see how constraints and variability play a role in much that life has to offer.

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