DOCUMENT SUMMARY

This research paper by Holly A. White investigates the relationship between ADHD and creative generation. The study finds that college students with ADHD are less constrained by existing knowledge and examples in creative tasks, demonstrating greater "conceptual expansion." Compared to their non-ADHD peers, participants with ADHD created more original alien fruit and product labels that conformed less to provided examples, suggesting that the cognitive style associated with ADHD may be advantageous for unconstrained, "outside the box" thinking.

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FORMATTED CONTENT

Thinking "Outside the Box": Unconstrained Creative Generation in Adults with Attention Deficit Hyperactivity Disorder

By Holly A. White

Abstract

Creative generation is structured around existing knowledge and task examples, yet overreliance on specific examples may limit imagination (Ward, T. B., Finke, R. A., & Smith, S. M., 1995). The constraining influence of knowledge during creative generation may be offset by **conceptual expansion**, a process of thinking outside traditional conceptual boundaries, which may be heightened by distractibility and mild executive dysfunction (Abraham, A., Windmann,

S., Daum, I., & Güntürkün, O., 2005). The present study explored the constraining effects of knowledge in adults with **Attention Deficit Hyperactivity Disorder (ADHD)**, a disorder characterized by impaired attention and inhibitory control (Barkley, R. A., 1997). College students with and without ADHD were compared on two creative generation measures: an alien fruit invention task that required participants to imagine fruit that might exist on another planet (Ward, T.B., 1994), and a product label invention task wherein the goal was to invent product names without using elements of task examples (Kray, L.J., Galinski, A.D. & Wong, E.M., 2006). ADHD participants created alien fruit that diverged more from Earth fruit and labels that conformed less to examples, relative to non-ADHD peers. Results suggest that adults with ADHD may be less constrained by knowledge during creative generation. Findings are discussed in terms of theoretical import and practical implications for individuals with ADHD.

Introduction

A motto among creative designers, "Never start at square one if you can start at square two," refers to the wisdom of using old models to inspire new creations (Goldschmidt, 2011). The guiding influence of knowledge on creative generation, or **"structured imagination"** (Finke, Ward & Smith, 1992), is both efficient and practical. Yet, knowledge may also limit creativity—thinking may get stuck or fixated on a particular idea (Finke et al., 1992). A real-world example is **design fixation**, wherein the creative process is stunted by interference from a specific example or perspective (Chrysikou & Weisberg, 2005).

Individuals also differ in the extent to which their imagination is structured (and thus constrained) by prior knowledge during creative generation. In particular, individuals with an overinclusive or **chaotic cognitive style** (Eysenck, 1993; Finke, 1996) may be less influenced by task examples or prior knowledge during creative generation (Abraham, Windmann, Daum & Güntürkün, 2005; Abraham et al., 2007). The present study investigated structured imagination and creative generation in one such group of individuals: college students with Attention Deficit Hyperactivity Disorder (ADHD).

Structured Imagination and Conformity in Creative Generation

Creative generation is guided by, and structured around, knowledge (Finke et al., 1992). In the laboratory, structured imagination is observable using the alien invention task (Ward, 1994). The goal of this task is to create a variant of a known category (e.g., animal or fruit), which might exist on another planet. Typically, participants first think of a known Earth-example of the category, which they then modify in various ways (Ward, 1994). Creative generation tends to start with the most accessible information (Finke et al., 1992).

> These studies demonstrate that when imagination is guided by knowledge, it may be constrained by that knowledge as well (Ward et al., 2002).

Creative generation is also influenced by recently activated knowledge in the form of task examples (Smith, Ward & Schumacher, 1993). Smith et al. (1993) showed participants three example toys prior to a toy invention task. Despite explicit instructions to create toys that were very different from examples, the majority of participants included the shared attributes of the task examples in their toy designs. This tendency to retain features of examples in creative products, dubbed the **"conformity effect"** (Smith et al., 1993) is a robust phenomenon.

Collectively, these studies suggest that the constraining influence of knowledge during creative generation may be reduced by: (a) increasing **conceptual expansion**, and/or (b) disrupting the default path of least resistance or distracting from relevant information. As it happens, individual differences in cognitive processing may affect creative generation in much the same way (Finke, 1996).

Chaotic, Divergent Processes in Creative Generation: Thinking Outside the Box

The tendency to rely on knowledge during creative cognition may be universal, yet individuals differ in the degree to which they are constrained by knowledge. Finke and Bettle (1996) describe two contrasting styles—ordered and chaotic—which are likely to impact structured imagination in opposite ways. **Ordered cognition** is linear, organized, and goal-directed. In contrast, the disorganized, spontaneous, and relatively unstructured style of **chaotic cognition** is likely to foster imaginative divergence, rather than structural connectedness (Finke, 1996).

In many ways, chaotic cognition resembles the **overinclusive processing style** described by Eysenck (1993). By virtue of broadly focused attention and conceptual activation, overinclusive thinkers are able to bring multiple ideas into close proximity, which facilitates original creative thinking (Eysenck, 1993). In the context of creative generation, people with an overinclusive processing style may engage in relatively high **conceptual expansion**, a process whereby traditional conceptual boundaries are extended (Ward, 1994).

Chaotic cognition may likewise increase the ability to overcome the constraining effects of recently activated knowledge during creative generation. Under these circumstances, attentional fluctuations and distractibility may give chaotic thinkers an edge (Eysenck, 1993; Finke & Bettle, 1996). Studies of creative generation have found lower conformity to task examples among individuals with trait schizotypy, patients with schizophrenia, and children with ADHD.

Creative Cognition in ADHD

ADHD is a neurological condition marked by distractibility, impulsivity, and hyperactivity that affects children and adults (American Psychiatric Association, 2013). The cognitive profile of ADHD, while detrimental to activities which require organized, linear cognition, may nonetheless be beneficial for some aspects of creative cognition. In particular, adults with ADHD may be more original and innovative during **divergent thinking** and may show higher levels of creative achievement.

Of particular relevance to creative generation is inefficient suppression of the **default mode network**, which has been linked to divergent creative thinking as well as ADHD.

More broadly, creative differences related to ADHD may be framed in terms of **chaotic cognition**. Like other chaotic thinkers, adults with ADHD are impulsive, score high on divergent thinking measures, prefer the idea generation phase of problem solving, and find unusual uses for common, everyday objects.

The Present Study

The unique neurological profile associated with ADHD may protect against the constraining effects of knowledge during creative generation. The present research addressed this gap by

examining the well-established phenomena of structured imagination and conformity to task examples during creative generation in a sample of college students with and without ADHD.

The **ADHD group was expected to show greater conceptual expansion**, as indicated by the inclusion of more atypical features on the structured imagination task, relative to the non-ADHD group. The creations of the ADHD group were also expected to be rated as more original.

On the product label invention task, overcoming knowledge constraints is indicated by lower conformity to task examples. The **ADHD group in the present study was expected to include fewer elements of the task examples** compared to the non-ADHD group, indicative of lower conformity during creative generation for individuals with ADHD.

Method

Participants were 52 undergraduate students at the University of Memphis. The ADHD group (n=26) and the non-ADHD group (n=26) were matched for age and gender. ADHD diagnosis was confirmed via self-report and standardized screening scales (Current Symptoms Scale; CAARS-S-SV).

Tasks:

1. **Alien Fruit Creation Task:** Participants were asked to "imagine, draw, and describe fruit that might exist on another planet that is very different from Earth." Creations were scored for **originality**, number of **typical features** (seeds, stems, etc.), and number of **atypical features** (unusual appendages, sensory organs, actions, etc.).
2. **Product Label Invention Task:** Participants were asked to create names for new products (pain relievers, nuclear elements, pasta) after being shown examples with common endings (e.g., Tylenol, Midol; radon, plutonium; spaghetti, lasagna). They were instructed NOT to copy the examples. Scores were based on **conformity** (number of invented labels using example endings) and **descriptiveness**.

Results

For the alien fruit creation task, there were reliable differences for originality, with the creations of the **ADHD group rated as more original** (M=3.387) compared to the non-ADHD group (M=2.77). The **ADHD group also included more atypical features** (M=1.65) relative to the non-ADHD group (M=0.654). The number of typical features did not reliably differ between groups.

For the product label invention task, the labels created by the **ADHD group included fewer task example endings** (M = 1.31), compared to the non-ADHD group (M=2.08), indicating lower conformity. The category descriptiveness of the labels did not reliably differ between groups.

Discussion

The present study tested the hypothesis that adults with ADHD would be less constrained by prior and recently activated knowledge during creative generation. As predicted, the ADHD group created alien fruit that was rated as more original and included more atypical features. The labels created by ADHD participants included fewer endings of task examples. Together,

these results supported the hypothesis that individuals with ADHD are less likely to be constrained by knowledge during creative generation.

> This finding is notable, because it suggests that individuals with ADHD were able to be creative while staying within task parameters.

The creative generation tasks in the present study were intended to tap dissociable elements of creative cognition: **conceptual expansion** (alien fruit task) and the ability to **overcome the constraining effects of recently activated knowledge** (product label task). The present findings are therefore an important addition to the literature describing creative cognition in adults with ADHD.

The goal of "creative realism" requires a balance between the structured and chaotic elements of creative thinking. In the present study, ADHD participants created alien fruits that met implicit and definitional criteria for the category fruit, yet demonstrated imaginative divergence and originality. On the product label invention task, ADHD participants created labels that conformed less to task examples, yet were equally descriptive of product type. Thus, the relatively mild chaos associated with ADHD may be divergent, but not overly so.

> Might a person with ADHD influence the creativity of others, perhaps by widening conceptual space or disrupting the default structured approach to creative generation? Perhaps adults with ADHD could be creative catalysts in the workplace.

Limitations

The small sample size limited the power of this study and results should be viewed as preliminary. The relatively high-functioning participants in the ADHD group (college students without comorbidity) may not generalize to all adults with ADHD. Replication with a wider variety of measures and participants is recommended.

Conclusion

The results of this study provide further evidence that ADHD may be advantageous for certain types of creative thinking; specifically, divergent, unconstrained creative cognition. Future research might explore the potential contribution of the chaotic ADHD mind in the workplace. By leveraging ADHD-related strengths and providing the necessary structure and support, individuals and organizations alike may be able to unlock the imaginative and innovative potential of the ADHD mind.