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IMPROVING THE CREATIVE PROCESS: ANALYSIS OF THE EFFECTS OF DIVERGENT THINKING TECHNIQUES AND DOMAIN SPECIFIC KNOWLEDGE ON CREATIVITY

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ABSTRACT

Although creativity may be a subjective construct that we can not evaluate independently of the domain, we may be able to objectively measure a person's creative thinking processes. The difficulty is that current tests are unable to provide consistent evaluations of individual creative thinking abilities with strong external validity. It is contended that this may be due in part to the measurement constructs being a measure of cognitive processing strategy choice rather than inherent creative thinking abilities alone. Additionally, domain specific knowledge factors may influence creative thinking processes and measures. This article combines a review of the literature with the findings of qualitative research undertaken at two of the world's leading advertising agencies to identify whether creative thinking techniques, and domain specific knowledge when primed, are key factors influencing creative outcomes. Finally, it develops a creative thinking research instrument that incorporates the findings. Factor and regression analyses were undertaken on the quantitative data with 10 variables loading onto two factors and accounting for more than 60% of the variance explained. Further findings and implications are discussed in the article.

Keywords: Creativity; Thinking techniques; Domain specific knowledge.

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I. INTRODUCTION

As we move into the current century there are few processes that are more important for us to understand than the creative process. Our creative ability sets us apart from the other creatures of this planet and holds the key to our continued success at the individual, organizational, and societal levels. Facing rapid change from multiple global sources of competition, organizations, and even entire economies, are realizing the need for innovation and adaptability. In order to nurture innovation we must have an understanding of the creative process.

Despite its importance the field of creative thinking is still relatively young and there are many issues of continued contention that are yet to be fully explored. The creative thinking process itself is still poorly understood and generates considerable debate. "One of the few points of agreement in the relevant literature is that creativity is multifaceted" (Runco & Charles, 1992, p.537). Arguably, the most important area that requires consensus in the creative thinking literature is the measurement of individual creative ability.

One of the biggest difficulties in the creative thinking literature is the lack of an instrument that can accurately measure, with any degree of external validity, what is commonly regarded to be a multifaceted construct. Given the need to understand both inherent and learnt associative abilities, the aims of this research were to: a) explore the contention that domain, inherent, and learned associative abilities are essential to creative thinking, b) to begin the complex process of developing a model of this process, and c) to develop a measure to test this model.

II. LITERATURE REVIEW

In developing a measure one must first define the concept to be measured and its various constructs. Historically there has been little understanding of the word creative or its importance. Since Guilford (1968) sparked renewed interest in the area there has been significant research aimed at providing more meaning to the word. While there is still no consensus in the definition of the term creativity, almost all definitions contain the concept of originality. As far back as the 1950's Bruner (1957), defined creativity as 'effective surprise', and, as stated by Runco and Charles (1992), "Of the various facets of creativity, originality is probably the most widely recognized" (Runco & Charles, 1992, p.537).

The originality view of creativity causes a problem, namely, any idea, no matter how bizarre and inappropriate to the situation, would be encompassed by the definition. Original, or divergent thought processes alone, therefore do not appear to fully account for a person’s ability to develop ideas that will become creative breakthroughs. Subsequently, academics have extended the definition of creativity to include the concept of appropriateness. Rothenberg and Hauseman (1976) define creativity in terms of originality and value. Sternberg and Lubart (1996) define creativity as the ability to produce work that is both novel and appropriate. For an idea to be creative it is therefore widely accepted in the current creativity research field that it must contain the two elements: originality and appropriateness (Jackson & Messick, 1967; Mumford & Gustafion, 1988; Runco & Charles, 1992; Kasof, 1995; Amabile, 1995; Ford, 1996; Mumford & Simonton, 1997; Runco, 2004). Subsequently, the following diagram is proposed to determine the creativity of an idea.

		Appropriateness	
		Low	High
Originality	Low	Not Creative	Not Creative Existing Solution
	High	Not Creative Bizarre Idea	Creative Idea

Figure 1: Basic creative combinations diagram

Creative Thinking Processes: Combination of Domains as Central to Creativity

The individual cognitive processes underlying originality and appropriateness were first introduced by Guilford in the 1960’s under the terms divergent and convergent thinking. “Although there are a number of things about the Guilford approach that are troublesome, divergent thinking has been an important anchor point in the study of creativity” (Schoenfeldt & Jansen, 1997, p.82). Divergent thinking involves being able to merge, or combine, unusual ideas. Since Guilford’s pioneering research into the concept of divergent thinking (1968), most researchers have acknowledged the importance of recombination of ideas as central to the process of creativity.

“Most current theories of creative problem solving stress the importance of the combination and reorganization process” (Mumford, Whetzel, Reiter-Palmon, 1997, p.11). In their study of creativity Coney and Serna (1995), stated that the essence of creative thinking was the

process of merging disparate mental elements to develop a new and appropriate combination. In support of this there has been some evidence that the ability to combine and reorganize memories is related to creative success. Owen (1969) - "...skills in combining and reorganizing those parts was positively related to patent awards and superior's evaluation of creativity obtained five years later" (as cited in Mumford, Whetzel, Reiter-Palmon, 1997, p.11).

Hence, much of the research into the creative thinking process focuses on the processes of creation, synthesis, or modification of ideas (Engle, Mah & Sadri, 1997; Mumford, Baughman, Maher, Costanza & Supinski, 1997). Finally researchers, (Mumford, Mobley, Uhlman, Reiter-Palmon & Doares, 1991; Scott, Longergan & Mumford, 2005) have noted that the creative process involves the creation of new memory structures either through the combination of distinct concepts, or the new combination of elements of existing concepts.

This previous research leads to the following definition of creative thinking;

Creative thinking is the process of merging thought categories, or mental images, either across or within domains, in ways that have not been done before, in order to develop an original and appropriate solution to a situation or problem.

This definition extends the research on creative combination processes to include the concept of domains. A domain has been described as the conventional wisdom regarding a particular field of research, or as the rules, practices and language of a recognized area of action (Ford, 1996). Domains are constantly changing due to new creative ideas, for example, Stone Age people would not have viewed the moon and the tides as relating to similar domains, but we are more likely to relate those two concepts today.

Domain specific knowledge is memory categories that assist us to solve problems and make decisions quickly. They are thought categories that we have learnt and built up over time, based upon knowledge from our environment, and are methods to respond to that environment. Ideas that are the combination of dissimilar domains are likely to be viewed as highly original because other people would not have made that distant connection. Whether those ideas are viewed as creative or not will depend upon the extent to which the ideas are accepted as appropriate within the field (Ford, 1996).

This domain combination process is similar to that proposed by Baughman and Mumford (1995). They reasoned that the combination process involved a process of: identification of

key elements of a problem, mapping key features from one category to another, combination of shared features to construct a new elaborated category, and refining of that new category to include emerging features. They also found that the inclusion of more atypical features in the combination process resulted in more original ideas. This highlights the importance of crossing domains in order to provide results that are seen by others as highly original.

Network diagrams are a good way to illustrate how creative ideas are generated, and how the degree of similarity between the domains that are combined will result in more or less original outcomes (Schilling, 2005). “In connectionist models, a network of nodes and links may represent patterns of communication among actual neurons or, more abstractly, the pattern of links between knowledge elements that collectively form a concept” (Schilling, 2005, p.136). These networks provide the basis for future searches for ideas. Additionally, how connections are made between, or within these networks, explains the creativity of new ideas. More random links between distant nodes will result in more significant shifts in the existing view of how concepts are combined (Schilling, 2005). What is central to both these theories is that the creative thinking process involves the combination of two separate ideas in a new way. More importantly the distance between the domains, from where the two ideas have come, will determine the degree of originality of the new idea.

Adding this research by Baughman and Mumford (1995) and Schilling (2005), to the previous research, regarding creativity as an idea combination process, leads to the following model:

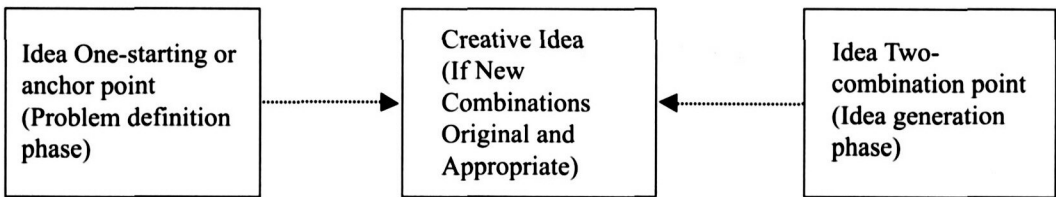


Figure 2: Model of creative thinking processes

From this model it can be seen that two points are critical to the creative process. The anchor points, or initial domain point that occurs during problem definition, and the combination point or domain that is accessed in order to make a new combination. One important issue under analysis in this article relates to the first stage of the creative thinking process – problem definition, and the extent to which informational cues may prime domain specific knowledge that sets the anchor points for the combination process.

Domain Specific Knowledge and Creative Combination Processes

It would appear that central to understanding the creative process is the need to understand how domain combination processes occur and what factors influence the process. Since the concept of divergent thinking was introduced by Guilford, many researchers have developed theories and models incorporating some type of divergent thinking process as part of their theories (Kirton, 1976; Scott & Bruce 1994; Baughman and Mumford, 1995; Schilling, 2005). What is common to all of these theories is that an individual must be able to connect an idea or concept from within memory, or new concepts from the environment, with another idea in a way that is different from how those concepts have been connected in the past. Creative thinking is therefore influenced by environmental information, but also existing domain specific knowledge.

Given that a person's existing knowledge will influence how they see the world and define a problem, critically important to the creative process is the knowledge and thoughts that a person brings to the creative problem. Many researchers assert that domain knowledge is central, and an antecedent, to creative thinking (Briskman, 1980; Amabile, 1983; 1988; Frensch & Sternberg, 1989; Simonton, 2003). Indeed, a person views a situation through the glasses of all their related previous knowledge that is cued by the situation. Subsequently, how a person defines a problem, which is influenced by their existing knowledge structures, will have a strong impact on how they go about resolving that problem - creatively or otherwise. For example, if a person defines a situation as 'the city has too many polluting cars driving around' - they are far more likely to look for solutions involving less polluting vehicles than if they defined the situation as 'the city is polluted as people are too reliant on cars for transportation'. How a person defines a problem is strongly influenced by their existing domain specific knowledge and how it is cued by the situation. An exhaust expert is more likely to frame the question as per the first example, while a cyclist is more likely to frame it using the second.

This process by which situational information cues domain specific knowledge and influences outcomes is widely acknowledged. As identified by Lovett & Anderson (1996) whenever we encounter a situation we use a combination of experiential (domain specific knowledge) and situational factors to assist in defining it. People define problems by "...active search and screening of representations activated by the situation and use of key elements of these representations, goals, diagnostic information, procedures, restrictions" (Mumford, Whetzel & Reiter-Palmon, 1997, p.9). As stated by Mumford et al (1997), in addition to the memories cued by the situational information, people will also apply decisions rules and procedures

to assist in defining a problem. If a person's memory categories, and/or decision rules, are so well established that they trigger a habitual response to a situation then creativity will not occur.

Elements in a situation will activate memories and memory categories and assist in how we define a situation. Strong existing category memories and decision heuristics may mean an expert automatically interprets a situation in a routine manner. The strength of this tendency has been shown in experiments on inadvertent plagiarism (Brown and Murphy, 1989). These experiments have shown that exposure to familiar stimuli results in the inadvertent use of that information in future problem solutions. Interestingly in an exception to the inadvertent plagiarism finding, it was found in an experiment by Tenpenny, Keraizakos, Lew and Phelan (1998) that inadvertent plagiarism did not occur when entirely novel stimuli was presented to respondents. This finding would indicate that it is the familiarity of information, which is dependent upon a person's domain specific knowledge, that influences the extent to which a situation will trigger memory categories that will be used.

Situational factors may trigger an expert's strong domain specific knowledge which in turn triggers memories that then influence how that situation is defined. Novel stimuli will not trigger those extensive memories and hence will not provide a strong basis for stringent problem definition. What is novel will be dependent upon the existing domain knowledge of the individual. Domain specific knowledge, when primed, may act to limit the originality of responses by providing extensive anchor points that reduce the potential for highly divergent cross category combinations to occur. In other words, situation information will trigger domain memories in the expert that are likely to result in a usual extensive domain being opened as the anchor point – problem definition. This extensive domain information is likely to lead to a narrowly defined problem and limit the potential diversity (distant domain combinations) of the solution. Wiley (1998) refers to this problem where an expert has difficulty developing ideas due to 'mental set fixation'. Essentially narrow problem definition in the expert can limit creativity.

Significant research in the area of problem definition and creative thinking has shown that the way a problem is defined has a significant impact on the creativity of the output (Vaughn, 1983; Kim, 1990; Mumford, Whetzel, Reiter-Palmon, 1997). Other research in the cognitive sciences has highlighted the importance of informational cues in influencing creative thinking outcomes (Ford 1996; Marsh, Landau and Hicks, 1996). From this research it would appear that the situation will cue a person's domain specific knowledge which in turn will determine how that person defines the problem. This problem definition will then act as the initial

anchor point that will influence the ability, or the perceived necessity, for an individual to make distant cross category connections. This highlights the potential importance of situational cues and domain specific knowledge as a factor in determining the originality of creative outputs.

Information we elicit from a situation, or information we are given about how to solve a problem, will prime responses, opening a person's related domain specific knowledge and setting the initial anchor points for creative idea combinations processes (Ford 1996; Marsh, Landau and Hicks, 1996). People without significant knowledge of an area, or that are not cued with information about the problems, will be free to open more unusual memory categories to use as the basis for problem solving. These unusual memory categories will result in more original outcomes, however they are likely to be viewed as less appropriate. Indeed creative thinking techniques provide this same function in that they result in unusual memory categories being accessed.

Creative Thinking Techniques

The work of practitioners such as De Bono (1968), has highlighted the proposition that creative output can be significantly improved through the use of creative thinking techniques. While the semantics of these techniques differ, fundamentally they encourage the use of divergent thinking by providing remote associative cues as the basis for idea generation (refer McFadzean, 2000). Divergent thinking techniques have been shown to effectively increase the creative output of training participants (Clapham, 1997; Scott, Leritz, & Mumford, 2004). This research by Clapham (1997) indicated that the effects of creativity training is largely attributable to the instruction of simple idea generation techniques. These creative thinking techniques appear to result in the opening of unusual memory categories to be used in the creative combination process, however more research is needed to confirm this proposition.

While creative thinking training has been shown to have long term benefits (Scott, Leritz, & Mumford, 2004), there has been only limited research into the reasons for these effects (Clapham, 1997). The use of creative thinking techniques might assist in providing both broader problem definition and the opening of more distant domains for potential combination. This broader definition of a problem, and/or the opening of unusual memory categories to find an answer, is inline with research by cognitive science researchers that highlight the importance of divergent combination processes as central to creative outputs (Baughman and Mumford, 1995; Schilling, 2005).

Schilling (2005), notes that “Several domains of research have suggested that insight arises from an unexpected connection between disparate mental representations” (Schilling, 2005, p.134). Her explanation of insight contends that it is these unexpected encounters that can cause insight or the aha moment to occur. In the same view Simonton (2003), contends that the role of chance is often a significant factor in creative discovery. Simonton also noted that often the creator was working on a number of different projects simultaneously when they came up with a creative breakthrough. It would appear therefore that this need to open distant domains is the central basis for creativity and this is what is emphasized in successful creative thinking technique training. The opening of unusual categories can assist the creative process either at the stage of problem definition, or by providing more distant domains thoughts for use in the combination process.

There are therefore two important influences on creative outcomes of individuals: 1) domain specific knowledge and its impact on how a person defines a problem given the situational primes, and 2) the importance of creative thinking techniques that force cross domain memory combinations to occur. However, before we can even begin to look at the influences of these two factors a better measure of individual creativity is needed.

Measures of Individual Creative Thinking Ability

At the same time that practitioners were focusing on developing creativity techniques, many academic researchers looked into measurement of individual creative thinking abilities. An important question that arose from the reasoning on divergent thinking was whether certain people might have some type of inherent processing ability that means they are more creative than others? While many of the seminal researchers of the current age have worked on measures to test individual creativity, few provide strong theories to explain individual creative differences based upon inherent processing differences. One of the few theories that attempted this question was the remote associate theory of Mednick (1962).

Mednick (1962) developed a theory of creative thinking that incorporated the concept of associative responses. Essentially the theory states that creative people are more likely to have a flatter associative hierarchy. A flatter associative hierarchy means people are able to bring up a broader range of disparate thoughts when cued with a concept or stimuli. In relation to the network model of creativity (Schilling, 2005), this means they are able to connect more distant memory nodes. It would then be expected that people with a flatter associative hierarchy, and therefore greater associative ability, should have a greater ability to generate the original concepts required for creativity to occur. Mednick developed the

Remote Association Test (RAT) to test his theory. However while the concept is intuitively logical and relates well to the importance of divergent thinking, subsequent research has not found strong correlations between people with strong RAT scores and other creativity measures, including, most importantly, creative output measures (Coney & Serna, 1995).

Hence, while divergent thinking is central to creative thinking, it has yet to be proven that there are people with greater propensity to associate remote concepts who are significantly more creative. "Creative abilities as measured by tests of divergent thinking predict later creative performance with correlations typically ranging in the .2 to .3 range" (Sternberg & Lubart, 1996, p.678). A number of probable explanations may account for this lack of external validity for the RAT.

First, the discrepancy may be explained by the inadequacies of the RAT as an accurate measure of creative outputs (refer Coney & Serna 1995 for a full discussion). Notably the RAT itself may be a measure that reflects a person's ability to find common associates between words in the test rather than testing for remote associative abilities (Worthern & Clark, 1971). Additionally the study by Coney and Serna highlighted the fact that the measurement tasks required in the RAT ask respondents to recognize a relationship between words according to the researcher i.e. find the word that associates the words blue and board (cheese). This is arguably a very different task from a person coming up with their own novel connection between two concepts. Finally, the number of associations a person may have is only one prerequisite of the creative process. Certainly an associative hierarchy model may explain individual differences in ability to develop divergent original ideas, but there is no guarantee those ideas will also be appropriate.

Given the inadequacies of the RAT test, and the fact that tests of associative ability may not fully capture the creative process, other more comprehensive tests were developed. Arguably the most important of these was developed by Torrance in the late 1960's – the Torrance Test. This measure used a number of simple methods to test a range of four factors he considered constituted the creative thinking process:

- i) Fluency – total number of relevant responses
- ii) Flexibility – number of different categories of relevant responses
- iii) Elaboration – amount of detail in the responses
- iv) Originality – the statistical rarity of the responses

The first and third of these factors relate to idea appropriateness while the second and third relate to idea originality. Hence the measure seems to better reflect the accepted components of a creative idea than the RAT measure.

While a variety of Torrance based tests have been commonly applied in the creativity literature these tests have proven largely unsuccessful at identifying creative individuals that would become creative leaders. "Fluency, flexibility, originality and elaboration fail to capture the concept of creativity (Amabile, 1983)" (as cited in Sternberg & Lubart, 1996, p.681). Additionally, as noted in Hocevar's (1981) review of the creativity measurement literature, divergent thinking tests have proven inconsistent with other measures of creativity. Individuals that rank highly on one method have not necessarily ranked highly on others (Hocevar, 1981).

Another major limit of the Torrance test is that results on the four constructs being measured do not show high levels of correlation between tests (Antastasi, 1988). A respondent may score highly on originality (and in fact all four constructs) in one test but poorly on this same construct in a different test. "The intercorrelations of different scores derived from a single test were higher than the intercorrelations of similarly labelled scores (e.g., Fluency) derived from different tests" (Antastasi, 1988, p.409). There are a number of possible explanations for this result. First, the measures may be task specific and the different versions of the tests may be testing knowledge of a particular domain of knowledge rather than individual creative thinking processes (Baer, 1998); although given the non-domain specific nature of the questions this appears unlikely. Second, and more likely, the creative thinking outcomes may be a result of a selection of cognitive processing strategy rather than inherent differences (Plucker, 1998).

So while there are a number of potential reasons for the test limitations, one reason gaining support in the creativity literature is that rather than individual creativity being largely dependent upon inherent differences in associative ability, it is more related to knowledge and deliberate use of creative thinking cognitive strategies or techniques. The research on creative thinking techniques and their effectiveness has provided some support for this proposition. Given creative thinking techniques work by providing cognitive strategies that force distant domains to be used in the creative combination process, the deliberate selection of these strategies must therefore be a major influence of the quality of creative outcomes. Indeed, learnt cognitive processing techniques may be more critical to creative outcomes than individual associative abilities.

If creative thinking outcomes are largely the result of learned cognitive processing techniques that encourage divergent idea generation rather than inherent associative abilities, this will have profound implications for the development and teaching of students and employees. However, significant research is still required to test this contention and determine the basis for those cognitive processes. Only then, if it is found to be true, can proper methods be developed to enhance the process. Additionally, like many areas of academic focus there is a strong need for research on the effectiveness of creative thinking techniques in groups other than students.

Literature Review Summary

In sum, it is interesting to note that a model of individual associative hierarchical ability; as well as an individual measure of what are deemed to be four key constructs, have not proven to be successful gauges of individual creative ability. Additionally, research is beginning to point toward the proposition that creative thinking is an ability that can be strongly enhanced through the use of learnt cognitive techniques. These techniques essentially replicate what has been acknowledged to occasionally happen by chance, the introduction of information for recombination that would not otherwise have occurred (Simonton, 2003; Schilling, 2005).

It is acknowledged that creative ideas require the combination of disparate memory categories and that the starting point for this combination process will influence the quality of the creative outcome (Ward, 1994). Situational information will cue memories that determine the anchor points for an individual, or in other words, how they define the problem. It can be hypothesized that while creative thinking may require some type of inherent associative ability, more critical to the creative process is knowledge and skill in techniques that force individuals to combine categories in ways that have not been done before; as well as the need to ensure that outcomes are not limited by a problem definition triggered by domain specific knowledge that may itself limit the combination process.

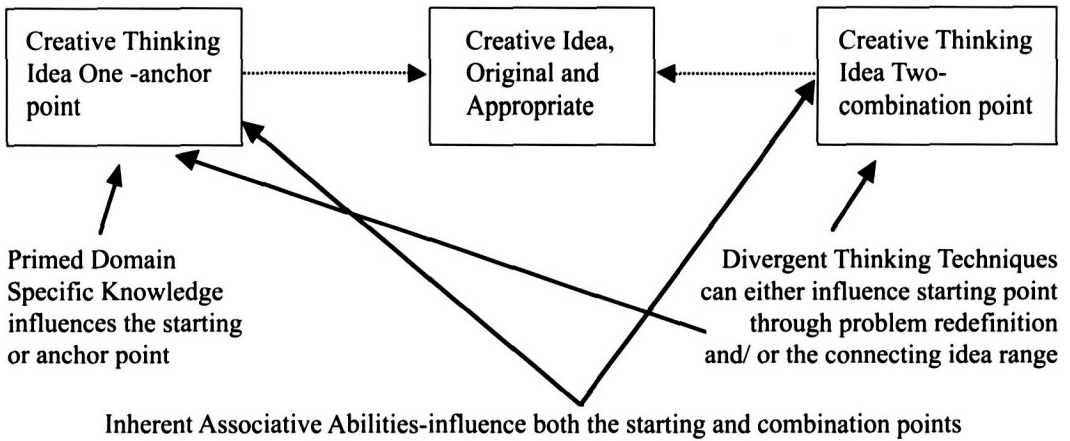


Figure 3: Extended model of creative thinking processes - the domain/ technique creativity model

The above model makes three propositions. First, there may be inherent abilities related to associative abilities that influence a person's ability to generate either unique anchor points, and/or combination points. Second, creative thinking outcomes largely depend upon the cognitive processing strategy chosen by respondents rather than inherent abilities, as well as a respondent's skill in the use of that cognitive processing strategy. Third, a person's knowledge of a domain acts to define the creative problem and may limit the originality of ideas generated through mental set fixation. In order to test these propositions an analysis of 'real world' creative practices was undertaken.

Qualitative Research

In order to develop a better understanding of the creative thinking process a qualitative research analysis was undertaken. Advertising agencies, and in particular advertising creative personnel (primarily copywriters with some art directors), were chosen as the basis for this analysis. The advertising industry was chosen as the basis for this research because it is a unique industry insofar that it employs people primarily for their ability to develop creative ideas without the need for other technical research skills (creative personnel – copywriters and art directors). Advertising ideas also meet the commonly held academic definition of creativity in that those ideas require originality and appropriateness in order to assist in the marketing of products. Advertising creative personnel focus on the generation and development of creative ideas and hence are a good unit of analysis.

Multiple depth interviews were chosen as the basis for the qualitative research. An initial series of interviews were conducted at a large New York Agency. Depth interviews were conducted with three senior, (at least 10 years experience) and two junior creatives. Depth interviews were conducted both with individual creatives and with creative teams of two, depending upon how the creative(s) worked.

Subsequent to this initial analysis a series of structured depth interviews were conducted at a major advertising agency in New Zealand, between December 2004 and July 2005. This agency is one of the largest agencies in New Zealand and hence allows for a high degree of job specialization. With the support of the creative director and the CEO, access was attained to all 14 creatives working at the agency, both art directors and copywriters. Both agencies used in the research are leading agencies that have recently won Agency of the Year awards.

The aim of this research was twofold. First, to determine if advertising creative personnel use creative thinking techniques, and if so, their importance to the creative process. Second, to determine how information may trigger domain specific knowledge that may limit the originality of responses.

Creative Thinking Techniques

Both sets of interviews were semi-structured with the researcher possessing a pre-determined series of questions. However, the order of the questions and the degree to which further prompts were used to elicit more in-depth responses varied, depending upon the interview itself. The creative personnel were asked questions in relation to creative thinking techniques, including:

- Q. How do you stay creative over time?
- Q. Do you use any creativity techniques to assist you in the creative process, such as word associations?
- Q. Where have your best creative ideas come from?
- Q. What is the creative process you go through?
- Q. Do you think creative thinking can be taught/improved through the use of creative thinking techniques?
- Q. What do you do when you get stuck for creative ideas?

To make respondents feel at ease recording equipment was not used during the interviews, instead the interviewer took notes and immediately wrote up the responses following the

interview. This text was then sent to the respondents and they were asked to read through the content and ensure the text accurately reflected their thoughts.

Q. What is the creative process you go through?

A typical response from a team of creatives stated;

We use a variety of techniques such as scenarios. We also generate negative ideas to get them (the ideas) out there so we would not dwell on them and have them limit new ideas. It is important to jot down ideas to come back to, to think of different ways to approach the problem – different words.

One junior creative said:

Research, lots of research. Example: working on a campaign for party pills at the moment, search on the Internet for drugs, night clubs etc. I get a lot of research information and this helps me think of ideas. I look for information on both the product and the users.

Another very senior creative said:

The two sides to everything lead to a basis for taking different angles to a creative problem. You can take the positive side to understanding an issue or the opposite, the negative side.

...Think about the process of a consumer of the product, from the first step of having that need or want for the product to the final stage of satisfaction after consumption.

It was interesting that many of the creatives, both junior and senior, looked for information that was connected to either the customer or the product.

Q. What do you do when you get stuck for creative ideas?

We sit and write down ideas and if stuck will go and google a word. The word may be unrelated like 'taste' for cat food and often the results will not result in anything but it will get them thinking along different lines. Music is also used, watching MTV can help with ideas. Unlike other creatives we do not look at other ads or awards books as this would not help us develop 'new' ideas. We look at movies or books however and use these as the basis for developing new ideas.

One senior creative used the novel method of random word association whereby he would open a dictionary or a language book and use the first idea on the page as the basis for generating new ideas;

I do develop creative ideas when I have a block I use books - picture, language books for learning Japanese, and the dictionary to get a random word for association and work my way out of a creative rut.

Often it was when an advertising creative became stuck for a creative idea that they used a creative thinking technique that forced more distant associations. These primarily used either related or unrelated words to force a distant domain to be opened for use in the creative combination process. All of the creatives discussed how they used some type of associative technique. While there was little overlap in regards to the actual techniques used by the different creatives, the one area in which there was overlap was with creatives making associative jumps based upon customer information.

Q. Do you think creative thinking can be taught?

"Yes - but it takes the right mind to be able to learn it. I was a butcher before the creative job. Anyone may have the potential but they must have the right way of thinking."

Another creative stated:

"Some techniques can be taught but not the process of making creative leaps."

Yet another response was:

"Creativity is both inherent and learnt. You can learn techniques for improving it at the same time some people are able to think that way while others are not."

A related question, used to elicit responses on any perceived creative thinking skills, asked:

Q. Do you have any advice you would give to new creatives?

Do not get frustrated. You learn ways of doing things, but it takes time. He has had a break from this job from time to time, a year or so. It takes a while to get back into it - to the way of thinking that is required.

Another response to this question was:

It is a way of thinking that took a while to get into. You learn better ways/techniques for doing things over time.

There was a mixed response in terms of whether creativity could be taught. Some creatives thought that there were techniques that could be learnt, but that creative thinking required a certain way of thinking.

III. DISCUSSION

All of the advertising creatives used divergent thinking techniques that allowed them to have some knowledge of appropriateness criteria, but still move to distant memory categories in order to achieve originality. The use of these techniques must develop over time as none of the creatives stated that they themselves were taught any divergent thinking techniques.

These findings support the contention that creativity may be more a process of choice of cognitive strategy selection (forced divergent techniques) and expertise in the use of that cognitive strategy, than inherent associative ability. Experienced creatives are highly reliant and skilled in the use of these techniques. Over time these techniques gravitate toward using customer information as a basis for associative connections as they will have learnt that those associations are more likely to result in acceptable advertisements.

Domain Specific Knowledge

The other area of research interest was the extent to which domain specific knowledge, which may be triggered by environmental information, may limit creativity. In the case of the advertising industry the creative briefing document is the primary basis for setting the anchor, or starting points, from which creative ideas are developed. The creative personnel were asked questions in relation to the briefing document and other information constraints, including:

- Q. Is there a role for structure in creativity?
- Q. What do you think of the creative brief? Is it a useful document?
- Q. What sort of information do you want in the advertising brief to help you develop your creative ideas?

- Q. Have you ever found that the creative brief contains too much information and constrains your creativity?
- Q. Do you think that your knowledge of all your many past campaigns, especially the really good ones, constrains your new ideas?
- Q. Would more consumer research assist in your briefing information?

In response to the question,

Q. What do you think of the creative brief? Is it a useful document?

One respondent answered,

It depends upon the person writing it. Sometimes it is good, sometimes not so good. Example: Watties wanting to sell cat food, the Suit (advertising executive) says they want to double their sales in a competitive market and their differential advantage was they have a lot of variety. Everyone in the market has a lot of variety, what is their USP? Needed to talk with the suit for two hours to come up with something. Pete [the organization's most senior creative] had to go up and work with them to get something useful. In the end the brief had four things, one is better of course. Sometimes the brief is 2-3 pages, they need to narrow it down to the key issue/word.

It is important not to get too structured as a creative. One of the problems with the brief is the same old information is coming through again and again – the marketing jargon, target market this, positioning that – but nothing new, no new angles to work from.

“Often the brief is too much information. It should be one page at most. They will often condense it down to the one key thing.”

...Just get to the point. A lot of useless information is in the brief. They boil the brief down to the key thing. It does however depend upon who writes the brief, some people are good and others not so good.

Typically, the creatives' responses to the creative brief mirrored the need for one key word or issue.

Q. What sort of information do you want in the advertising brief to help you develop your creative ideas?

“Get the central concept from the brief and then make jumps out from there for the creative idea.”

Common statements were:

*“It is important not too get to structured as a creative”, and
“The brief needs new angles”, or
“Too much knowledge of an area in itself limits creativity.”*

It is often not brief. It needs to have the one key thing, and needs to be something new, something different. It is no good having Cadbury Moro and Baked Beans and V all saying they give you energy, and that is all you get in the brief. A better brief would be one saying ‘we need to increase our sales over the Xmas period. Pete (the most senior creative) had a better insight for Baked Beans – everyone has a can of beans in the back of the cupboard, develop ads on taking that journey.

The process by which creatives use the briefing document was relatively uniform, with most looking for a key word that they used as the basis for idea generation. All creatives mentioned that the briefing documents were too long and needed to focus in on the unique selling proposition:

IV. FURTHER DISCUSSION

These findings emphasize the importance of the briefing document. The brief is often the first piece of information the creatives receive and is the basis for their idea generation. As the role of the creative is to develop original ideas that will capture the attention of the target audience it is important that they develop ideas that will be different from those of the majority of the population. Therefore, because the brief is the starting point from which initial jumps/associations are made, too much information in the brief may limit the originality of ideas. However, advertising creatives have knowledge of creative thinking techniques that allow them to overcome any anchor point limits imposed by information from the creative brief.

What was apparent in the responses was that a bad briefing document contained too much information that was not ‘new’. Rather than developing the creative ideas from scratch, creatives welcomed briefing information that provided a unique starting point. Too much information on the target market, the product, or common selling propositions, led to a negative perception of the brief. This supports the contention that the briefing document acts to cue domain specific information that then sets the starting, or anchor points, from which ideas are generated and affects creative outcomes.

These findings are summarized as follows:

- i) All creatives use creative thinking techniques – most relate to close associative leaps, and product and user information
- ii) Too much information in the brief limits originality because it sets cues and hence limits the starting point for divergent thinking.
- iii) Developing creative ideas requires a broad basis of starting points. The use of forced divergence techniques was a method used to generate ideas and overcome creative blocks.

While these findings point toward an important new direction in the creativity literature and support the contention that creativity may in fact be an ordinary cognitive process that can be enhanced through the use of certain cognitive thinking techniques, the qualitative nature of the findings means further empirical verification is required. The next stage is to develop a research instrument that is able to identify if in fact forced divergence creative thinking techniques and domain specific knowledge are significant influences on creative outcomes. To this end a research instrument was designed and tested.

Experimental Objectives

The aim of the experiment was to develop a measure that accurately captured the two constructs that make up creativity: originality and appropriateness. This measure can then be used as an effective research instrument evaluating the effect of cued domain specific knowledge and forced divergence effects on creative thinking.

Materials

A response booklet was developed in which instructions were used to manipulate the two treatments resulting in the following four conditions:

- i) Primed Domain Specific Knowledge and No Creative Thinking Technique
- ii) Primed Domain Specific Knowledge and Creative Thinking Technique
- iii) No Primed Domain Specific Knowledge and Creative Thinking Technique
- iv) No Primed Domain Specific Knowledge and No Creative Thinking Technique

Instructions

Treatment One manipulated the level of domain specific knowledge participants had access to in developing an advertisement. In Conditions One and Two participants were given instructions to develop creative ideas and three new advertisements for a new brand of fly spray that used a common creative strategy – fast kill. In Conditions Three and Four the creative strategy to be used was a novel strategy – rapid breakdown of the chemical residues of the fly spray. In conditions one and two prior campaign knowledge would be cued by the instructions leading to the use of that knowledge in the anchor points for idea generation. In conditions three and four no domain specific knowledge would be cued as the instructions referred to a novel strategy.

Treatment Two manipulated the effect of the use of a forced divergence creative thinking technique. The conditions were manipulated based upon whether or not participants were given a forced divergence creative thinking technique when developing an advertisement. In conditions two and three respondents were told to use a key word to assist them in generating their creative ideas. In Conditions One and Four participants had to generate creative ideas, and three separate advertisements, without the assistance of these words.

Three different key words were used for each of the three advertisements that respondents were asked to develop in conditions two and three. The key words were Stone, Frog and Winter. Given that these words have different levels of association with the concept that respondents are trying to develop ideas for, ‘fly spray’, the respondents’ perceived degree of association between the concept and these three words was assessed in a post manipulation check as part of a self-assessment rating form.

Methodology

A group of students from a University of Waikato marketing research undergraduate course were asked to participate in the experiment to evaluate the research instrument (the response booklet). The experiment was a two by two full factorial design. Two treatments were manipulated resulting in four different conditions. The two treatments were the level of domain specific knowledge and the use of forced divergence techniques. For the second treatment the order of the words that were used as part of the forced divergence technique were also randomized to remove order effects. To test the degree of association between the words used in the forced divergence conditions a manipulation check was undertaken as part of a self-assessment rating. The study was a between-subjects design with random allocation of subjects to the various conditions.

Participants

Fifty-one undergraduate students from the University of Waikato in Hamilton New Zealand volunteered to take part in the experiment as part of their normal class lessons. Of the group that filled in the self-assessment form (N=50) 35% were male and 65% were female students. Participants were unaware of the different conditions under study and were randomly allocated to one of the four conditions by the response booklet that they received. These booklets were ordered from Condition One to Four to ensure participants that may have had similar characteristics to each other due to their seating arrangement, were allocated to different randomised conditions. Each booklet asked the student to develop three separate advertisements.

Procedure

Given participation was voluntary, control conditions were not optimal. The experiment was undertaken during normal class hours during the second half of a two-hour session and due to ethical considerations participants were told that they had full discretion in terms of the questions they answered and the depth of response. Despite the voluntary nature of the experiment all but one of the class members chose to answer their questionnaire. Instructions for the session were provided to students by the researchers.

Once the response booklets were handed out to participants the instructor asked participants to read the instructions carefully and answer the questions to the best of their ability. Participants were told that there were no correct or incorrect responses. The instructor also wrote the time allocated to each task on the whiteboard and informed participants when they were to move to each of the separate tasks. Participants then answered the questions as per the instructions given. After respondents had completed the three advertising generation tasks the final two pages of the response booklet contained a self-assessment rating questionnaire. This questionnaire also contained classification and post-test manipulation questions.

Measures

The effects of the two treatment factors were assessed by two methods. Firstly respondents filled out a self-assessment form that was contained on the final two pages of the booklet. This self-assessment form contained six, 7-point Likert scales where participants rated their three advertisements on originality, appropriateness, creativity, attention, communication

of benefits, and effectiveness respectively. Participants were asked to use their own subjective definition of the six factors. Participants were also asked to rate their advertisements in comparison to other advertisement they had seen on 10 additional factors taken from the measure developed by Koslow, Sasser & Riordan, (2003). Finally, participants were asked: their gender, whether they had taken any advertising courses previously, and a manipulation-check rating question to assess association levels of the three key words used in the forced divergence technique conditions.

The researcher also assessed results based upon the number of creative responses generated in each of the conditions and for each of the three advertisements. As this experiment was a test of the measurement instrument blind judging of the experiment outputs to ascertain an external evaluation of appropriateness, originality, and creativity was not undertaken.

Summary of Results

A factor analysis was undertaken on all 16 variables. An analysis of the scree plot indicated three factors had eigenvalues of greater than one with more than 60% of the variance explained. A rotated loading matrix found that the three variables; creative, attention, and emotionally expressive, loaded onto two different factors and these items were clouded. Those items were dropped and a factor analysis was undertaken with the remaining factors loading onto two factors, which were named originality and appropriateness. Ten variables loaded onto those two factors with loading of at least .62 and the two factors accounted for more than 60% of the variance explained.

Given the lack of stringent control conditions used, and the limited sample size, extensive independent judging of the responses was not undertaken. There is an obvious need for response evaluations to verify the self-assessment methods but this is beyond the scope of this initial study. The strong loading factors whose variables related to the two factors – originality and appropriateness, provide initial support for the research instrument. The next stage is to use the measure on a larger sample group of advertising personnel.

V. CONCLUSION

The research points toward the importance of creative thinking techniques and domain specific knowledge in the propensity of an individual to develop creative ideas. Indeed, an area of significant interest in the creativity research field is the extent to which expert

knowledge influences creative outcomes. As indicated in this research, the starting points provided by environmental cues will trigger domain specific knowledge that will have an impact on subsequent idea generation processes. The information we use to cue our employees and students will be central to the originality and appropriateness of their responses.

Certainly as educationalists and trainers we have all experienced the process whereby: when we provide more structure in our questions this results in less original outcomes. How we set the question has long been recognized as the fundamental first step in the creative thinking process (Getzels & Csikszentmihalyi 1975; Mumford, Baughman, Threlfall, Supinkski & Costanza, 1996; Mumford, Whetzel & Reiter-Palmon, 1997; Reiter-Palmon, Mumford O'Connor Boes & Runco 1997). This research supports the starting, or anchor point, basis for that influence. Indeed, it appears even in an industry where originality is central to success, basic informational cues result in creative experts being limited in their combination outputs. This indicates that creativity is essentially a process of connecting divergent memory categories and this process can be curtailed if the anchor points, or initial information cues, are too narrowly defined.

In relation to creative thinking techniques advertising creatives use these creative thinking techniques extensively. It would appear that rather than differences in remote associative abilities being the key factor in creative outcomes, knowledge and experience in the use of creative thinking techniques is central. This research has taken the first step in identifying the importance of anchor points and creative thinking techniques through field research and the development of a robust research instrument and creativity measure. Further research is needed to provide empirical validation of these findings.

If further research supports these initial conclusions, then our emphasis in creativity education and development must radically change. Although associative abilities may still result in some of the differences between individual creative outcomes, the importance of creative thinking techniques during idea generation will mean that instead of the research emphasis, and recruitment policies, being on finding the elusive creative individual, it will shift to educating students and staff throughout an organization in creative thinking techniques. We may be able to shift from the assumption that creative thinking is a rare and extraordinary talent, to a process that can be achieved by all, and that must be also encouraged in all.

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