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The Creative Process: The Effects of Domain Specific Knowledge and Creative
Thinking Techniques on Creativity

A Thesis
submitted in fulfillment
of the requirements for the Degree
of
Doctor of Philosophy
at the
University of Waikato
by
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M.M.S. (distinction) (Waikato)

University of Waikato
2006

Abstract

As we move further into the 21st century there are few processes that are more important for us to understand than the creative process. The aim of this thesis is to assist in deepening that understanding. To achieve this a review of the literature is first undertaken. Combining the many different streams of research from the literature results in the development of a four-stage model of the creative thinking process. The four stages are problem definition, idea generation, internal evaluation, and idea expression. While a large range of factors influence the various stages in this model, two factors are identified for further analysis as their effect on creativity is unclear. These two factors are domain-specific knowledge and creative thinking techniques. The first of these factors relates to the first stage of the creative thinking process (problem definition), specifically the extent to which informational cues prime domain specific knowledge that then sets the starting point for the creative combination process.

The second factor relates to stage two of the model (idea generation), and the proposition by some researchers and practitioners that creative output can be significantly improved through the use of techniques. While the semantics of these techniques differ, fundamentally all techniques encourage the use of divergent thinking by providing remote associative cues as the basis for idea generation. These creative thinking techniques appear to result in the opening of unusual memory categories to be used in the creative combination process.

These two potential influences on the creative outcomes of individuals: 1) domain specific knowledge, and 2) creative thinking techniques, form the basis for an experimental design. Qualitative and quantitative research is undertaken at two of the world's leading advertising agencies, and with two student samples, to identify how creative thinking techniques and domain-specific knowledge, when primed, influence creative outcomes. In order to measure these effects a creative thinking measurement instrument is developed.

Results found that both domain-specific knowledge and creative thinking techniques are key influences on creative outcomes. More importantly, results also found interaction effects that significantly extend our current understanding of the effects of both primed domain-specific knowledge and creativity techniques on different sample populations. Importantly, it is found that there is no 'one size fits all' for the use of creative thinking techniques, and to be effectively applied, creative thinking techniques must be developed based upon the respondent's current domain and technique expertise. Moreover, the influence of existing domain-specific knowledge on individual creativity is also dependent upon how that information is primed and the respondent's knowledge of cognitive thinking strategies.

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1.0 The Complexity of Creative Thinking Research

Research into creativity is not new. Creative thinking has been of interest to scholars for centuries, and while the modern era of creative thinking is acknowledged to have commenced in the 1950's, more anecdotal recorded research has been identified from the 19th Century (Becker, 1995). In a review of the 19th century literature, Becker identified five key questions that scholars were addressing at the time:

1. "How is creativity defined?"
2. Who has creativity?"
3. What are the characteristics of creative people?"
4. Who should benefit from creativity?"
5. Can creativity be increased through conscious effort" (Becker, 1995, p.219).

It is a testament to the complexity of the field that a century later these same issues are continuing to be addressed (Becker, 1995). What makes creative research complex is the wide range of individual and environmental factors that influence the creative process. "After decades of theory development and empirical research, researchers still know surprisingly little about how the creative process works" (Woodman, Sawyer & Griffin, 1993, p.316)

Despite the long history of research, it has only been in recent years that the importance of the area has started to gain increased significance and attention. The rapid pace of environmental change, and the need to develop a society that is open to that change, has necessitated the need for sound research into the field. In our turbulent global environment, this need to understand the creative process is intensifying. In an increasingly diverse world, the importance of understanding how to nurture individuals to express their opinions, and be open and tolerant to new ideas and their expression, is increasing.

"Because he is confident, he is also tolerant where there should be tolerance. A world of tolerant people would be peaceful and co-operative people. Thus creativity is the key to education in its fullest sense and to the solution of mankind's most serious problems" (Guilford, 1968, p.147).

As stated by Guilford this understanding has particular importance in relation to education systems and in organizational development. However, many people would also agree with the proposition that, "Not Enough Attention is being given to Nurturing Creativity" Lee Yuan Tseh, Nobel Prize Winner.

1.1 The Importance of Studying Creative Thinking

Academics, business leaders, and politicians around the globe are acknowledging the need for a more creative workforce. Facing rapid change from multiple global sources of competition, organizations, and even entire economies, are realizing the importance of innovation and adaptability. The increased rate of change, due to global competitive pressures, means that environments are dynamic, and the development of creative individuals is essential. “What needs to be addressed is how to achieve a good balance between content knowledge and creative thinking skills in our curriculum” *Teo Chee Hean* Singapore Education Minister 2000.

Central to the development of creative individuals are our educational systems. As we move into the new millennium we must change our emphasis from previous techniques and systems that focus on teaching how to solve the problems of the past. The limitation in our educational systems in developing creative individuals has been acknowledged since the 19th Century. Bagehot 1873 - “Rather than educational institutions being on the cutting edge, Bagehot saw them as, “...asylums of the ideas and the tastes of the last age,” which “out of their dignified windows pooh-pooh new things” (Becker, 1995, p.226).

More recently, one of the pioneer creativity researchers of the modern age, Guilford, stated the need for creativity to be nurtured in educational institutions.

“We frequently hear the charge that under present-day mass-education methods, the development of creative personality is seriously discouraged. The child is under pressure to conform for the sake of economy and for the sake of satisfying prescribed standards. We are told by the philosophers who have given thought to the problem that the unfolding of a creative personality is a highly individual matter which stresses uniqueness and shuns conformity. Actually the unfolding of the individual along the lines of his own inclinations is generally frowned upon. We are told, also, that the emphasis upon the memorizing of facts sets the wrong kind of goal for the student.” (Guilford, 1968, p.84)

1.1.1 Standardized Education Versus Nurturing Creative Thinking

Despite these early assertions by Guilford (1968), many educational systems are becoming more, not less, standardized (Furedi, 2006; Goldberg, 2004; Hargreaves & Goodson, 2006; Hughes, 2004; Platt, 2004). Education is rapidly becoming a vast global business. The need to develop standardized tests to ensure conformity of achievement is promoting education systems that are further stressing memorization and rote learning methods. This results in a paradoxical problem. In a world requiring high levels of creative thought, education systems are encouraging processes that result in a less creative graduate. Much of this problem is due to our lack of understanding of the creative thinking process.

“We have little actual knowledge of what specific steps should be taken in order to teach students how to think” (Guilford, 1968, p.84). In the drive for economies of scale and simple testing methods in the education business, educational institutions may in fact be limiting one of the key skills for organizational and economic success: creativity. There is a crucial, and immediate, need for a better understanding of how to nurture creative thinking. However, despite its importance, research into the creative process has remained a relatively minor area of research (Feist & Runco, 1993; Sternberg & Lubart, 1996).

Despite this need for creativity research, it is not a simple process. Creative thinking is a process that 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). The problem is there is still not an accepted model of the creative thinking process, let alone a widely accepted creativity measure. A variety of methods are used to test creativity currently, but debate on what constitutes creative thinking and its measurement are still major issues. Without consensus in these areas it is difficult to properly define the creative thinking process, and subsequently how it can be nurtured.

1.1.2 Creativity in Advertising

One area in which progress has been made has been through research into advertising creativity. While creative thinking is of importance to industry, education and society in general, advertising creativity research has attracted notable attention given the importance of creativity to the industry. One of the reasons that creativity is of such interest to advertising researchers is that advertising ideas must meet the widely accepted criteria for creativity - original and appropriate to the target market.

Moreover, the advertising industry is highly dynamic, with new media and constantly changing consumer and product characteristics. Finally, the industry is unique in respect that it employs a significant percentage of its workforce purely as creative idea generators. Hence, advertising creativity research has the potential to greatly assist in our understanding of the creative process.

1.2 Literature Review

To understand the research problems in the area of creative thinking, it is important to review past and present research. Modern research on creative thinking has developed over the last five decades with considerable change in the emphasis of the research throughout that time.

Much of the early work was based upon the assumption that creative thinking was an inherent talent that needed to be recognized so that creative individuals could be nurtured to assist society. "Historically, the study of creativity began with the concept of genius" (Sternberg & Lubart, 1996, p.680). Creative thinking was initially thought of as a talent possessed by exceptional people, and researchers looked at ways that talent could be identified, and future leaders nurtured.

Subsequently, early seminal work on creative thinking, by researchers such as Guilford and Torrance, focused on measurements to identify creative individuals. As early as the 1950's Guilford studied creativity in people using paper and pencil tests (Sternberg & Lubart, 1996). One of the significant early developments was a test

devised by Torrance in the middle of last century, the Torrance test of creative thinking. This test measured four factors he considered constituted the creative thinking process:

- ↗ Fluency – total number of relevant responses
- ↗ Flexibility – number of difference categories of relevant responses
- ↗ Elaboration – amount of detail in the responses
- ↗ Originality – the statistical rarity of the responses

1.2.1 Difficulties with Divergent Thinking Measures

However, tests of divergent thinking abilities have been widely criticized for lack of predictive validity (Baer, 1994; Crockenberg 1972; Weisberg, 1993). While some support for divergent thinking tests has been found (Plucker, 1999), there is a growing consensus that methodological issues are still apparent and multiple measures of creativity are needed. Indeed, recent researchers have questioned the usefulness of some of these earlier measures: “Fluency, flexibility, originality and elaboration fail to capture the concept of creativity (Amabile, 1983)” (as cited in Sternberg & Lubart, 1996, p.681), and Baer (1994) criticizes the use of such tests on the basis that creativity is task-specific. The reason for the problems with the early measures is in part a reflection of the complexity of the creative process. A range of personality, environmental, inherent, and cognitive factors are all posited to influence the creative thinking process. Therefore, only looking at general cognitive processes does not result in the identification of individuals who will become creative leaders in society.

Subsequently, some researchers have focused on studying creative thinking by first identifying it through results, or finished products/ideas, and then analyzing the personality and environmental factors that led to those results (Amabile, 1996; Ghiselin, 1963; Harmon, 1963; Mumford & Gustafson, 1988). In a study of creativity measures in 1981, Hocevar concluded that “... a simple and straightforward inventory of creative achievement and activities appears to be more defensible than the more commonly used methods” (Hocevar, 1981, p. 459).

1.2.2 Measuring Creativity through Products/Ideas

Some of those authors who have tried to circumvent the problem of a lack of adequate tests to capture the creative thinking process, look at the end product of the creative thinking process as the measure; “The idea that creativity should be defined in terms of novel, socially valued products, instead of in terms of processes, has received increasingly wide support over the years (Amabile, 1996; Ghiselin, 1963; Harmon, 1963).” (Mumford & Gustafson, 1988, p.28). These researchers have made significant progress in understanding personality and environmental influences on creativity. However, this output based measure creates its own evaluation problems.

Defining creativity based upon a judgment of ‘novel’ and ‘socially valued’ products, rather than some measure that captures its key process elements, still presents difficulties in terms of subjective judgment. The measure identifies the two widely accepted criteria of creativity – originality/novel and appropriateness/socially valued (Rothenberg & Houseman, 1976; Mumford & Gustafion, 1988; Runco & Charles, 1992; Mumford & Simonton, 1997) however, judging these two criteria is an issue.

1.2.2.1 Subjective Evaluation

If the product must be ‘socially valued’ or appropriate, then the questions must be asked: Valued by whom? How many people need to value it before it is creative? What is a creative product? Is it a piece of art or something ‘useful’? What about a photograph, a landscape painting, a theatrical play? Both originality and appropriateness measures depend upon the background of the judges assessing the end product or idea. Lack of knowledge, or exposure, to an idea by a judge will mean that judge will rate that idea higher on originality than the judge that has knowledge of that same idea.

Different judges from different parts of society are likely to have different views on what is valued. Indeed, Ford (1996) proposed a definition of creativity that is domain-specific, based on the premise that ideas cannot be evaluated independently of the domain. For researchers to be able to find agreement on ‘socially valued products’

then only certain highly visible products (e.g., the computer, the cell phone) would qualify. “A practical criterion of creativity is difficult to establish because creative acts of an unquestioned order of excellence are extremely rare.” (Guilford, 1968, p.79).

Researchers following the ‘novel, socially valued’ definition have focused on a few rare outputs, and the people that have generated them. One stream of research in this area is the historiometric study of creative thinking. Researchers in this area have identified widely accepted creative individuals throughout history and analyzed them for common traits (Gruber, 1968; Simonton, 1984). However, despite the fact that most people would not refute the creativity of great inventions, such as the computer or the telephone, this output based measure does not account for the fact that many groundbreaking ideas were not either, widely recognized, or accepted, at their time of invention. As stated by Runco (1995) “Instances of unrecognized or overlooked creative work are easy to find” (Runco, 1995 p.379).

Creative ideas are by their nature ‘original’ and hence may not be viewed as appropriate to people who are using existing, no longer appropriate, criteria to evaluate those ideas. The problem with the novel, socially valued product criterion is it would not have recognized highly creative people, such as Van Gogh, until long after they had gained acceptance. Indeed, many highly creative people have not been recognized for their creative talents until long after their departure. “Vincent van Gogh – whose notoriously poor self-presentation alienated his contemporaries, instilled negative performance expectations, and helped delay acceptance of his work until well after his death (Wallace, 1969)”, (as cited in Kasof, 1995, p.347).

While these measurement issues are not confined to output measures of creativity, the limitation of this approach to our understanding of what makes a creative individual, is compounded by a number of factors: the small number of inventions that fit this consensus measure of creativity, the time lag between the invention and subsequent analysis, the potential for attribution biases, and the fact that many ideas might, due to environmental factors, never make it to fruition. This means this approach is limited

in its ability to recognize creative people and understand the creative thinking process itself. Without this understanding of the process it is difficult to determine how to improve and encourage it in individuals.

1.2.3 Creativity – A Common Process?

While research based upon output measures has provided a number of important insights, it only analyzes successful ideas and hence may not be a true reflection of an individual's creativity. "In some ways, by only studying implemented ideas, the researcher is sampling on the dependent variable and is overly restricting what constitutes creative ideas." (Schoenfeldt & Jansen, 1997, p.74). One reason the output measure might not be a good measure of an individuals' creative thinking ability is idea expression. Due to social and self confidence issues, there may be a significant difference between the number of creative ideas had by an individual, and the number of ideas expressed by that individual.

A related expression issue is that an idea must be viewed by society as original for it to be creative. If an individual, without assistance, were to develop a time machine one month after someone else had developed a similar machine, that second person would not be viewed as being as creative. An individual might develop ideas that are original at an individual level, but because these ideas are not new (original) to society, they will not be viewed as creative. Indeed our education systems largely encourage the rote memorization of ideas developed by others, rather than individual idea generation and development. For creativity to be encouraged it also requires an acknowledgement of individual-level creative thinking processes.

Moreover, the socially valued, novel product-based measure of creativity encourages memorization and rote learning which may in itself restrict a person's ability to think creatively. For an individual's creativity to be acknowledged by society, that person will have to produce ideas that are seen as entirely new to the field in which they are researching. This would require extensive domain-specific knowledge in an area in order to ensure those ideas were new to society. It would not encourage ideas to be expressed that are new at an individual level but only at a societal level, this may

further limit creative expression as individuals are unsure if their ideas are actually new.

1.2.3.1 Creativity: A Confluence of Factors

Additionally, it is acknowledged that for a creative idea to succeed, a confluence of factors is required (Sternberg and Lubart, 1996). Many of these factors are beyond the control of the person that generated the creative idea. Hence product-based measures might in fact limit our understanding of what the individual creative process is, or how to encourage it. With the output approach we only recognize creativity in people who are able to: generate good ideas, gain acceptance of those ideas, have those ideas at the correct time, have access to the correct resources, and have the desire or motivation to bring those ideas to the world. In reality a reasonable number of individuals probably have the ability to generate significant breakthroughs that may greatly assist humanity, but they lack expression skills or adequate support. Hence we must still endeavor to understand the creative process, despite the difficulties with external validity. Only then can we nurture tomorrow's leaders.

Central to the issue of creativity education is the need to know if it can indeed be taught at all. To this end researchers have noted that while some personality traits may be more common in creative individuals, the creative thinking process may in fact be a common human talent. Other researchers have begun to look at processes that can enhance that talent (Clapham, 1997; McFadzean, 2000; Tanner, 2001). If creativity is dependent upon both inherent abilities and learnt cognitive processes then it is critical for us to be able to measure creativity as it occurs. This will allow us to identify ways in which it can be improved. Like most intellectual processes however, creativity is probably dependent on existing knowledge structures (domain-specific knowledge), and upon both inherent abilities and cognitive processes that can be developed (creative thinking techniques).

1.2.4 Domain-specific Knowledge and Creative Thinking

Domain-specific knowledge comprises memory categories that assist us to solve problems and make decisions quickly. We have learnt and built up these thought categories over time. They present the methods we use to respond to our environment. The problem with domain-specific knowledge is that it provides us with existing answers but may not always help us to find new ones.

How does existing knowledge influence our ability to think creatively? Two views that relate existing knowledge to creative thinking are espoused in the literature. One view focuses on the need for existing information to be used as the basis for idea generation. The other view focuses on the connection of divergent memory categories to expand knowledge.

“With regard to knowledge, on the one hand, one needs to know enough about a field to move it forward. One cannot move beyond where a field is if one does not know where the field is. On the other hand, knowledge about a field can result in a closed and entrenched perspective, leading to a person’s not moving beyond the way in which he or she has seen problems in the past (Frensch & Sternberg, 1989)” (as cited in Sternberg & Lubart, 1996, p.684)

1.2.4.1 The Domain Specific Knowledge Dilemma

This quote emphasizes a problem in regards to domain-specific knowledge. On one hand we cannot create something out of nothing, we must know about a particular field if we are to push the boundaries of that field outward, on the other, too much knowledge may itself limit a person’s propensity to be creative. To understand the role of domain-specific knowledge in the creative thinking process requires a more detailed analysis of the various steps in the creative thinking process.

High levels of existing domain knowledge may result in individuals responding to a situation using very well developed automatic responses that therefore limit originality, and hence creativity. A researcher’s strong domain-specific skills may

make them more rigid, less able to think outside that memory category – ‘the box’. Not only might high levels of domain knowledge result in automatic thought processes as responses to problems, it may limit how problems are defined, even before idea generation takes place.

Domain-specific knowledge may influence the propensity for a creative outcome by influencing how a problem, or situation, is defined. When defining the problem the experts may feel that they ‘know’ what works and does not work and therefore define the problem more narrowly. They may also set more stringent search and evaluative criteria thereby judging poorly those ideas that come from outside those parameters. At the other end of the creative thinking process, when it comes to the evaluation of creative ideas, the domain-specific knowledge of experts means that experts may not evaluate the new ideas of others positively because they do not fit in with the conventional wisdom.

1.2.4.2 Domain Specific Knowledge Effects on the Stages in the Creative Thinking Process

There is an alternative view as to the creative thinking process that does not focus on the importance of existing knowledge. This view focuses on creative thinking as a process of combining existing divergent memory categories in new ways to develop a field. Under this view, knowledge could be expanded without extensive knowledge of that field. It may be that we can think of things beyond the current field even if we do not know where the field ends. Expansion of the boundaries of a field may occur by adding information from outside the field, i.e. combining very different memory categories to a field. This view focuses less on extensive domain-specific knowledge as a key to creative thinking. Both of these views have merit and are not mutually exclusive. Indeed each approach to creativity may result in different types of creative thinking processes and outcomes, Big C or little c outcomes (refer chapter 3).

This issue of domain-specific knowledge and whether it encourages or discourages creative thinking is therefore dependent upon its effects and use at different stages in the creative thinking process - from problem definition to final idea expression. This leads to the need to understand the creative thinking process itself in order to

determine if, and when, domain-specific knowledge helps or hinders creative thinking. For example, it might be that domain-specific knowledge assists the development of creative ideas at one stage of the creative thinking process but at another stage it acts as a limitation. This potential problem highlights the need to understand the multiple stages in the creative process and how domain-specific knowledge works as a factor during the different stages of developing creative ideas. These issues will be the focus on chapters 4 and 5.

1.2.5 The Creative Thinking Process

Researchers currently debate whether the creative thinking process is unique or not, for example, “Weisberg (1993) proposed that creativity involves essential ordinary cognitive processes yielding extraordinary products” (Sternberg & Lubart, 1996, p.681). While historically creativity has been associated with genius, some more recent researchers have taken the viewpoint that creative thinking is an ordinary process that requires extraordinary circumstances to produce a visible result (Kim 1990; Sternberg & Lubart, 1996). For example, Sternberg and Lubart hold that: “It may be, for example, that the results are each within the scope of ordinary psychological response but that the confluence that leads to creativity is extraordinary” (Sternberg & Lubart, 1996, p.685). Unfortunately, if this is the case it complicates the identification of the creative process, insofar as we must not only understand the creative thinking process but also all of the variables that result in the ordinary process resulting in extraordinary results. It therefore becomes more difficult to determine whether creative results are due to environmental factors or individual thought processes.

Unfortunately, while researchers have begun to look at the internal process of creative thinking those who view the creative process as something special have little consensus on which model of the process is best. There have been a number of theories that attempt to explain the creative thinking process, many of which expand upon the concept of divergent and convergent theory formulated by Guilford. “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).

1.2.5.1 Creativity and Divergent Thinking

Mumford, Whetzel and Reiter-Palmon point out that; “Most current theories of creative problem solving stress the importance of the combination and reorganization process” (Mumford, Whetzel, Reiter-Palmon, 1997, p.11). This divergent construction of ideas may result in the phenomenon recognized by many people as insight, or the Gestalt ‘aha’ moment:

“All fluency, flexibility and elaboration abilities, verbal or non-verbal, belong logically to a general category called divergent’ production. In divergent production of ideas, verbal and non-verbal, from a given item (or given items) of information we generate other appropriate ideas. In divergent production, the answers produced are varied and they are likely to be numerous.” (Guilford, 1968, p.114)

Rather than being dependent upon extensive knowledge of a particular domain, creativity may be the result of jumping across memory categories to apply different information to a particular problem. As Plato said: “The artist disposes all things in order, and compels the one part to harmonize and accord with the other part, until he has constructed a regular and systematic whole” (as cited in Vaughn, 1983, p.45). Indeed, 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 superiors evaluation of creativity obtained five years later” (as cited in Mumford, Whetzel, Reiter-Palmon, 1997, p.11). This line of thinking may be similar to what Guilford was talking about when he brought up the process of transformations.

“Transformations offer an important key to the understanding of insights or intuitions. The latter are often recognized as sudden changes, and changes are transformations. What are the principles of laws of transformation? And what of the phenomenon of incubation, on which only one intentional study can be cited?” (Guilford, 1968, p.14)

This transformation process may well be the basis for the initial development of original ideas, as part of the creative thinking process. Again however, this divergent thinking process, while important at some stages of the creative thinking process i.e.

problem definition and idea generation, still needs to be complimented with evaluative processes that rely on domain-specific knowledge. Additionally, this divergent thinking may be dependent upon both inherent associative abilities and/or learnt cognitive techniques. These issues will be the focus on chapters 4 and 5.

1.2.6 Creative Thinking Techniques

While many academic researchers have focused on understanding the creative thinking process, many practitioners have looked into enhancing the process of creative thinking using techniques that essentially assist in the combination of divergent memories (De Bono 1968). Advertising agencies use a variety of techniques such as free association, divergent thinking, analogies, and metaphors (Wells, Burnett & Moriarty, 2003) Their aim has been to develop creative thinking techniques to encourage creative thinking within individual agencies. These practitioners approach creative thinking as a common inherent ability that can be enhanced through the use of divergent thinking techniques.

While there are numerous techniques that have been developed by practitioners to enhance the creative thinking process, there has been only limited academic research into combination and reorganization techniques (Mumford, Baughman, Maher, Costanza & Supinski 1997). “As Messick (1995) pointed out, validity is an evolving property and validation a continuing process of research and investigation, including considerations of content, criteria, and consequences fashioned into a construct framework.” (Schoenfeldt & Jansen, 1997, p.84). Certainly validity of the usefulness of creative thinking techniques needs further analysis, as this would give insights into the process, and whether the creativity is the result of extraordinary or ordinary processes.

The contention of practitioners, that creative thinking can be taught - correlates with the view of creativity as a common human process and the notion that a person is being creative if they themselves do something different from what is normal for him/herself at the individual level. "Creativity consists of looking at the same thing as

everyone else and thinking something different” - Attributed to Albert Szent-Gyorgy (Kaminer, 1977). It does not have to be different from everyone else in the world, or even different from the judges evaluating them, it merely has to be different for the individual.

This view of creative thinking gives further significance to the identification of individual creative thinking abilities. At the same time, while creative thinking may be a common process, it only results in extraordinary results under certain conditions. Subsequently, the need to understand these external environmental conditions has also been an area of extensive research.

1.2.7 Environmental Influences on Creative Thinking

The environment determines if creative thinking is encouraged and if creative ideas are nurtured to fruition. Researchers have identified a range of environmental factors that influence the creative thinking process including: leadership and management style (Scott & Bruce, 1994; Yong, 1994; Scott, 1995; Pollick & Kumar, 1997), group influences (Amabile, 1996; Woodman, Sawyer & Griffin, 1993; Scott & Bruce, 1994), motivation and goal setting (Shalley, 1991; Mullin & Sherman, 1993; Mehr & Shaver, 1996), and organizational characteristics (Woodman, Sawyer & Griffin, 1993; Basadur, 1997; Moukwa, 1995; Tesluk, Farr & Klein, 1997; Ambrose, 1995). At a broader level cultural norms within different societies have been acknowledged to influence the creative tendencies of the populace (Therivel, 1995).

One common structure used to categorize the various studies into creativity is that attributed to Rhodes (1961/1987), (Runco, 2004), person, product, press and process. This structure highlights the complexity of understanding the creative process where environmental, individual, system and social factors all influence the potential for creativity to occur. Indeed, it has been posited that it is only through the correct confluence of a range of factors that true creative breakthroughs can occur (Simonton, 2003). The environment and the individual play critical roles in the creative process.

Undoubtedly creativity is a result of nature and nurture. One early theory of creativity relating to inherent creative ability is that of Mednick (1962). Mednick's associative hierarchy model proposed that some people have flatter associative hierarchies and are hence able to see association between two ideas that other people can not. Mednick developed the remote association test to measure these differences, but the test has not proved able to differentiate between creative individuals.

Other tests, most notably the Torrance test of creative thinking (Torrance, 1974) have also tried to identify the nature aspect of creativity. However, these early tests have largely been unable to identify inherent skills of creative individuals, although this does not mean that some people do not possess internal cognitive processes that enhance their creative potential. With an understanding of the environmental influences a better understanding of the creative thinking process might be possible, and researchers will be able to refocus on the process of measuring individual creative potential.

1.2.8 Individual Differences in Creative Thinking

In research that looks at individual differences in creative abilities, some perceptual abilities and personality attributes have been identified as being more prominent in creative individuals. Some of these individual perceptual and personality aspects also relate back to the effect of domain-specific knowledge. The creative person is able to accept alternative ideas, they consider new information and become aware of it rather than making a judgment on it. The creative individual is more perceptive, less judging. However, a problem for the individual trying to be creative is the apparent conflict between knowledge and fixation. While researchers have asserted that domain specific knowledge is an antecedent to creative thinking (Briskman, 1980; Simon, 1986; Amabile, 1983; 1988; Frensch & Sternberg, 1989; Simonton, 2003), others have shown that in creative thinking tasks the expert can be outperformed by the novice as they become fixated on the old knowledge structures for solutions (Adelson, 1984; Ward, 1994; Wiley, 1998)

So becoming too knowledgeable in an area may result in a person judging new information based upon their existing knowledge structures and hence becoming less open to different information. A person may therefore lose that creative ability to integrate the new information and become aware of the possibilities. It may be that this limit of domain-specific knowledge can be overcome through the use of creative thinking, or divergent thinking techniques. Such research will provide insights into the degree to which creativity is an inherent ability or a learnt skill.

1.3 Conclusions

The biggest problem faced today in the field of creative thinking is still its definition and measurement. How can we develop an appropriate measure of creative thinking when creative thinking itself is so hard to define? The reason it has been so hard to define is the conflicting requirements in the creative thinking process itself. To come up with both originality and appropriateness at the same time and in the same measure is extremely difficult, as originality and appropriateness might be conflicting measures of the same construct - unless of course we view creative thinking as a multi-stage process. A multistage view is that creative thinking involves both originality and appropriateness, but not at the same time. Creative thinking is a process of separate and distinct steps.

The aim of this dissertation research is twofold: first, to develop a model of the creative process, which will provide a basis for measuring creative thinking and developing creative thinking expertise. Second, to undertake specific research into the influence of domain-specific knowledge and creative thinking techniques on the creative thinking process.

1.4 Chapter Content

This research begins in chapter 2 with an integrative review of the literature in order to define creativity and its measurement. Chapter 3 picks up on one area of contention in the literature, that of differences in the degree, or eminence, of creative ideas and whether they should be studied in the same way. A four stage model is then developed

that attempts to capture the basis of the creative process. It also looks at how differences in the way in which ideas are combined will result in different types of creative output. Chapter 4 looks at the effects of domain specific knowledge on the first two stages of the creativity model; problem identification and setting of the anchor points: Chapter 5 looks at the effects of domain specific knowledge on the final two stages of the creativity model; idea generation and internal evaluation, and idea expression.

Chapter six and seven discuss a series of in-depth interviews that were undertaken in two of the world's leading advertising agencies in both the United States and New Zealand. Findings from these interviews provide the basis for the design of an experimental research instrument. The pre-test results of this research instrument are written up in chapter 8. Chapter 9 develops the methodology for the resultant experimental design to be undertaken on a variety of sample groups. The next chapter discusses how the results from that experiment were coded, while the final three chapters discuss those results, their implications, and limitations.

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2.0 Definitions of Creativity

What is creativity? Can anyone be creative or is it limited to the realms of greatness? What are its antecedents, and can it be developed? These are central and defining questions in the area of creativity research that have yet to be fully answered. After more than 50 years of research we still do not have an accepted definition of creativity, or an understanding of the creative process. This chapter first reviews the literature, and then combines the major streams of creativity research in order to provide definitions of: a) creativity and the creative thinking process, and b) insights into their measurement. Second, the chapter develops a process-based model of creative thinking. Finally, it reviews this model in relation to the methods of creativity measurement introduced in chapter one.

Different Definitions of Creativity

In a creative dialogue in the July/August 1999 Edition of *Psychology Today*, leading creativity researchers, Mihaly Csikszentmihalyi and Robert Epstein, debate whether creative thinking is a teachable act performable by all, or a rare occurrence that society only recognizes in a few individuals in any given age. The answer to this debate lies in the definitions of what is being discussed. The term 'creative' has been applied broadly to many different types of processes and outcomes, with limited consensus as to its definition or measurement.

The Consensus View

How we define a construct determines how we measure it. Creative thinking has been defined in a number of different ways. Many researchers have defined creative thinking in relation to the final outcome, based upon a consensus view of creative products/ideas (Gruber, 1974; Katz & Thompson, 1993; Simonton, 2003). This product-based definition of creativity requires the correct combination of individual variables, processes, and environmental factors to come together for creativity to occur. In essence this means that creativity becomes a very rare act that is attainable by the few. Creativity is subsequently researched from the point of view of creative

outcomes, primarily creative ideas or products of an unarguable nature. The researcher can then look at the creative individuals who developed these products and try to identify characteristics of both the individual and the environment that have enabled the creative act to occur.

Under the consensus view of creativity, creativity is defined as far more than merely the cognitive processes that underlies the production of creative ideas. It encompasses all the factors that result in an idea coming to fruition. This approach has resulted in significant research into the sociological and personality variables required for creative achievements. While a lot has been learned from this approach, particularly from the work of people such as Simonton (2003), other research approaches are needed in order to understand the cognitive processes that underlie creativity.

The Ill-Define Problem View

In contrast to product-based definitions, other researchers have stated that creativity is the act of solving ill-defined problems (Lumsden & Findlay, 1988; Mumford & Gustafson, 1988; Sternberg and Lubart, 1991) Creativity then becomes a process of generating new or novel solutions to suit a particular situation, irrespective of whether those ideas ever come into reality. This approach identifies and acknowledges the critical aspect of problem recognition and definition, as a fundamental stage determining the degree of creativity in the solutions generated. Indeed, there is much to be learned about creativity based upon the work of cognitive psychologists in the area of problem solving, (Lovett & Anderson, 1996) and by looking at the influence of existing category structures on creative thought (Wiley, 1998; Marsh, Ward & Landau, 1999; Ward, Patterson, Sifonis, Dodds & Saunders, 2002).

The Mental Processes View

Researchers investigating the mental processes involved in the creative thinking process (Osborn, 1953; Gordon, 1961; Clapham, 1997; Newell, Shaw and Simon, 1958; Finke, Ward, & Smith, 1992) have identified a range of cognitive processes and structures that may enable more creative outcomes to be generated. More over research by Chapham (1997) has shown that these cognitive processes can be

enhanced. Hence, it appears that the cognitive processes underlying the initial stages of the creativity process can be taught, and structured techniques that allow divergent thoughts to occur may be crucial in individual creative development.

These different approaches relate to the debate regarding the extent to which creativity is a teachable act, or a rare occurrence undertaken by a few creative geniuses. It can be posited that the creative thinking process is a process that all people are capable of performing, with some degree of variance due to genetic differences, chance encounters, and/or a person's knowledge of enhancement techniques. However, the act of creativity requires not only creative thinking abilities, but also the right combination of environmental and personality characteristics to be present. This need for a multivariate approach to what is a complex process is increasingly being advocated by prominent creativity researchers (Mumford & Gustafson, 1988; Clapham, 1997; Runco, 2004). However, if we are to gain an understanding of how creativity can be developed we must be able to isolate the various stages in the creativity process as well as the environmental influences. First, we must start with a definition of creativity itself to act as the basis for measurement.

2.1 The Definition and Measurement of Creative Thinking Processes

For the purposes of any form of serious academic endeavor the key construct to be measured must be clearly and precisely defined. In the area of creativity research this has proven to be an elusive endeavor. As stated by Feldhusen and Goh (1995), creativity is a complex cognitive activity, which is concerned with a complex mix of environmental, personality, chance, and even product factors. Subsequently, there are many views on the nature of creativity and the measurement of the construct. Given the range of complex variables that all influence creativity, it is essential that the process is well-defined, and broken up into distinct stages for analysis.

The Originality Component

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 no consensus in the definition of the term creativity, almost all definitions contain the concept of originality. Bruner (1957), for instance defines creativity as 'effective surprise' (as cited in Jackson & Messick, 1967), 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 importance of originality, as central to creativity, is also in line with the layperson's view. A study by Runco and Charles (1992) found that people view creativity as most strongly tied to the concept of originality. However, originality in itself is not enough for creativity.

The Appropriateness Component

"Creative - 'presumably intended to mean original,' ...It has aptly been called a luscious, round, meaningless word" (Gowers, 1968, p.114, Oxford English Dictionary). The originality view of creativity causes a problem that is highlighted by this Oxford dictionary definition, 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. Therefore, academics have extended the definition of creativity to include the concept of appropriateness. Rothenberg and Houseman (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 now widely accepted in the creativity research field that it must contain the two elements: originality and appropriateness.

2.1.1 The Creative Thinking Process

Accepting that an idea must be both original and appropriate to be creative, the next step is to determine how a person undertakes the required thought processes to achieve creativity. A number of researchers have developed models that identify distinct thinking processes involved in the creative thinking process. One of the most important conceptual cornerstones underlying these models is Guilford's concept of divergent thinking.

“All fluency, flexibility and elaboration abilities, verbal or non-verbal, belong logically to a generally[sic] category call ‘divergent’ production. In divergent production of ideas, verbal and non-verbal, from a given item (or given items) of information we generate other appropriate ideas. In divergent production, the answers produced are varied and they are likely to be numerous.” (Guilford, 1968, p.114)

Subsequently, creative thinking has long been associated with the concept of divergent thinking, and in particular with the notion that the development of original ideas requires some type of cross memory category combination. Researchers following this idea have developed theories in line with Guilford's concepts of divergent and convergent thinking processes. In a study of workplace creative behavior Scott and Bruce (1994) discuss two types of problem solving styles: associative and bisociative. Bisociative involves the combination of separate domains of thought simultaneously without rules, in order to encourage intuition and imaginative outcomes. Associative is thinking based upon habit and logical associations. As they state either style can be appropriate depending upon the situation. Indeed, original and appropriate outcomes presumably require both types of cognitive processing: bisociative in order to develop original ideas, and associative in order to evaluate those ideas for appropriateness.

Other authors have also come up with models of the creative thinking process that discuss two distinct cognitive processes. Finke, Ward and Smith (1992) discuss a model of the creative thinking process that involves initially divergent thinking in order to generate creative ideas and subsequently evaluative thought processes. These two stage models of creativity are in line with many of the techniques developed to

enhance individual creativity, such as brainstorming. Creative thinking techniques, like brainstorming (Osborn, 1953), emphasize cognitive processes that are initially free from logic and rules. Evaluation only takes place after the initial idea generation stage.

It would therefore appear that creative thinking processes require first, cognitive processes that encourage free association and a lack of structure for originality, and second, processes that subsequently evaluate those ideas for appropriateness. However, evaluation during the idea-generation stage of the creative thinking process has been found to inhibit creativity. “Evaluative uses of research were mentioned negatively, if at all, as destructive to the creative process” (Kover, 1995, p.600). It would appear that it is essential to start with some type of bisociative processing and, only once ideas have been generated, to move on to associative processing for idea evaluation and refinement.

These two-step models of the creative thinking process do not necessarily lead to creative ideas and products that are valued at a societal level. For this to occur creative ideas must not be merely generated and assessed, also specific environmental conditions must exist. In addition the correct personality characteristics and abilities must be possessed by the idea generator in order for them to express and gain support for those ideas. Subsequently, models need to recognize the importance of problem identification and idea expression.

2.1.2 A Creativity Process Model - Stage One: Problem definition

As recognized by researchers such as Reiter-Palmon, Mumford, Boes and Runco (1997) and Kim (1990), how a problem is defined will have a strong influence on whether it is approached in a creative way. Kim (1990) stresses that the problem must be difficult, and unable to be answered in a straightforward fashion before it will lead to the need for a creative solution. However, any problem has a creative solution option, although this option might not be optimal.

There is always the potential to view a problem from a perspective that will lead to an original solution. If a person has the problem of ‘an untied shoe lace’ the obvious

solution is to reach down and tie it up. Alternatively, they could view the problem as 'shoe laces come untied' and they might develop the more original solution of 'a shoe that does not need laces'. Vaughn highlights the importance of question framing in research: "What you want to know determines what you do, and the limits of the findings" (Vaughn, 1983, p.46). How we view a situation or problem will have an influence on the degree to which we generate creative solutions. How a person constructs a problem has been shown to have an influence on the quality of the solution, Reiter-Palmon, Mumford, Boes and Runco (1997).

Stage One: Problem Definition

Given that the how a person defines a problem has been shown to influence the solution, the first step of the creative thinking process is problem definition. This critical first step requires understanding how different people approach situations and define problems. Do some people have a greater propensity than others to define problems from broader, less conventional perspectives? If there are differences between people, are they due to inherent cognitive processing differences or are they learned? Because any problem can be defined as new or existing, the extent to which a person's existing knowledge causes them to view in a problem as new or the existing will have a strong impact on the potential for creative problem solving. It would also be expected that techniques that act to deliberately redefine the problem in a new manner would result in more creative ideas being generated (Tanner, 2001). Creative problem solving might therefore require a view from the creator that an original solution is required, as well as the deliberate use of divergent processing strategies.

Problem Definition and Choice of Strategic Process

An area of interest in relation to the problem definition process is whether the way in which a problem has been defined influences the type of problem operators (Lovett and Anderson, 1996) that are selected to apply to answering it. Research by Lovett and Anderson (1996) indicated that under experimental conditions people used a combination of past experience and problem-specific information when deciding on the method they would use to solve a building stick task. Interestingly, respondents

continued to use previous problem-solving operators that were successful in the past, even when either a simpler method was available or the problem itself had changed. It would appear, therefore, that people are constrained by their past experience or domain specific learned knowledge, in choosing problem operators.

However, the building sticks experimental task might not reflect the difficult, ambiguous conditions that are more likely to require creative solutions. The researchers also concluded that the type of problem-solving strategy used by respondents in their experiment is not universal, and in certain conditions more problem-specific learning behaviors might be exhibited. While it is likely that under most conditions people will continue to use a combination of their past experience and problem-specific information to choose problem operators, the extent to which people use different operators under different conditions is critical. It might be that if we are asked for a 'creative' solution we are less likely to use historical information, or experience, as the basis for problem operator selection (Harrington, 1975).

This view that people will become dependent upon certain problem specific behaviors to solve problems they have encountered before ties in with the model of problem solving by Logan (1988), which stated that current problems are either solved by using an algorithmic process or a memory-based process. According to the theory these two processes are in competition with each other to solve the current problem first. With increases in the number of experiences with a problem, there is an increased likelihood that the memory-based processing will win out. In such an example-based problem solving model, the extent to which a problem is similar to a problem whose components have been encountered in the past will determine the extent to which past experience will provide the basis for the solution.

Therefore, it would be expected that the amount of past experience a person has in an area, or their domain-specific knowledge, will have an impact on the method they use to solve a problem. Domain specific knowledge accrues through experience and allows us to solve problems at low cognitive cost using existing problem solving operators. Dependence upon domain specific knowledge will mean problems are solved in a similar manner than in the past. However, if a problem is defined in a new creative manner, or a creative solution is asked for, it might be less likely that the

person will use their domain specific knowledge to try to solve the problem and alternative problem solving operators will be used. As stated by Lovett and Anderson (1996), the conditions under which different types of learning dominate is an area that needs further research.

In summary if a person defines a problem in a similar manner to the way they have done so in the past they are likely to rely on historical problem operators and solve the problem in a similar manner to the way they have done so before. The greater the amount of experience, the greater the likelihood of using historical problem operators. However if a problem is viewed as needing a creative solution it may mean that past history or domain specific knowledge will be used less in selection of problem operators. This is critical because it is the initial stage of the problem definition, or framing, which will determine the extent to which domain-specific knowledge influences the use of creative problem-solving operators versus historical experienced-based problem solving operators. Whether a person develops creative solutions will be strongly influenced by the way in which they define a problem.

Environmental Conditions and Problem Definition

Another important and interesting issue in problem definition is the extent to which environmental conditions, or stimuli, might result in the redefinition of a problem. It has been noted that, “The accidental nature of many discoveries and inventions is well recognized. This is partly due to the inequality of stimulus or opportunity, which is largely a function of the environment rather than of individuals” (Guilford, 1968, p.79). Environmental conditions might well act to assist in the redefinition of an existing problem in a manner that means new information is used to solve the problem, rather than reliance on past experience.

It might be that creative people benefit from random chance. That is it could be that chance information enables creative problem definition to occur by allowing new information to be used in the problem definition process, where previously the problem solver was constrained by their reliance on past experience to define the

problem. New problem definition then causes cross category memory thinking, or unusual problem operators, to be applied at a time when previously a limited search model had been used. This effect might account for the importance of the incubation period (Wells, 1993), a period where ideas are not constrained by a limited problem definition or search model.

Problem definition from a cognitive processing perspective is the process of determining the anchor, or starting, points for idea generation or setting the internal search model parameters. Guilford discusses the concept of setting the search model parameters in relation to creative thinking (1968). The extent to which we look for solutions from divergent cross memory categories, or merely search for solutions from within the current domain will depend upon how broadly we have set our anchor points and hence parameters. The anchor points determine the extent to which we scan either a narrow or broad range of our memory categories for a solution. The broader the anchor points the more likely we are to look at more unusual memory categories to find a solution and therefore generate a more original response. If we define a problem narrowly then we limit our ability to think across categories in order to generate new ideas.

2.1.3 Stage Two: Idea generation

Stage two in the creative thinking process, idea generation, involves finding other ideas to combine with the anchor points we have opened during problem definition. Creative thinking is about divergent, cross category thinking. For creative solutions to be generated the process must involve some type of bisociative thinking that allows more divergent or cross category memory combinations to occur. Since the concept of divergent thinking was introduced by Guilford (1968), a number of creativity researchers have incorporated some type of divergent thinking process as part of their theories (Kirton, 1976; Scott & Bruce 1994; Baughman and Mumford, 1995; Schilling, 2005).

In advertising creativity Goldenberg, Mazursky & Solomon (1999) developed a templates model of advertising creativity that works by providing respondents with alternative, unusual, yet appropriate domain information to assist in their idea generation processes. These templates force alternative memory categories to be opened to allow divergent idea generation to occur. Many creative thinking techniques also work following these same forced divergence principles (De Bono, 1968; McFadzen, 2000). What is common to all of these methods and 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.

Divergent thinking might result from the opening of existing, yet unusual, internal memory categories, but can also be triggered through random environmental information. Indeed, environmental factors might account for the assertion (Simonton, 2003) that "...creative behavior in science demands the intrusion of a restricted amount of chance, randomness, or unpredictability" (Simonton, 2003, p.476). Additionally, Simonton (2003) posits that creative scientists are often working on several projects at any particular time. These factors might allow a person's anchor points to be expanded; essentially allowing them to step away from their limited and limiting search model i.e. their work problem. Working on multiple projects will mean that alternative domain information is being accessed which might then be applied to the alternative project and its problems where otherwise this cross domain thinking would not occur.

Finally, research by (Wells, 1993) has shown that an incubation period can assist the creative process. This incubation period might result in a temporary relaxation of search model criteria allowing new information to be accessed and combined. This process might also be what occurs when creative thinking techniques are used.

It appears from research on the cognitive processes which underlie creative thinking, that divergent cross category thinking can be enhanced through creative thinking techniques (Clapham, 1997; Tanner, 2001; McFadzean, 2000). While there is some debate as to whether creative thinking techniques actually work or not, this debate is brought into perspective when we consider the measures of creativity that the

researchers are using. Idea generation is encouraged through the use of creative thinking techniques. These techniques might result in broader anchor points and lower levels of internal evaluation occurring. Subsequently, it would be expected that ideas would be more original and less appropriate, when creative techniques such as brainstorming are used. Therefore, creative thinking techniques might not result in improvements in creative ideas when using a measure that incorporates both originality and appropriateness. However, the same techniques should result in an increase in original idea generation.

2.1.4 Stage Three: Idea Refinement

Having a creative idea in itself is not enough to achieve creativity. The appropriateness of the idea will be determined by peers in the domain. The third stage of the model involves analytical thinking processes to develop ideas to make them appropriate. According to the model, this stage involves more logical, within domain processing. Once an idea has been generated connections between that idea and existing memories will be formed.. Ideas that are deemed to be appropriate are then expressed. Idea refinement is the process of extending category links and providing justification, explanation, or elaboration, for the creative idea within the domain.

The small network model of creative insight, by Schilling (2005), discusses the process that occurs during elaboration. In her network model of insight it is proposed that when a new connection is made between two previously unconnected memory nodes, there is then a cascading effect as multiple additional links between a person's memory categories develop. Once two previously unlinked ideas in memory are combined a number of previously unrelated memory categories become obvious. Schilling uses the example of the child making the connection between animals and humans. Previously for the child there was no connection but then the link between the two is made based upon the fact that both have two eyes. From there other links and similarities become more apparent.

This idea refinement stage is an ongoing process where connections are made, then new ideas are generated, leading to further connections and so forth. It is akin to the Geneplore model suggested by Finke, Ward and Smith (1992), where ideas are first

generated and then explored further in a cyclical process. The different requirements for idea generation and idea refinement are important to note, as idea refinement requires knowledge that must be learnt through time and effort, while thinking across domains is a processing strategy that can be learnt and applied when and where it is needed. As noted by Nickerson (1999), there is a need to distinguish between lasting traits and temporary mindsets that are applied as part of a problem solution. A person may choose to apply an uncritical strategy in order to develop a large number of ideas, but then apply their extensive more normal logical traits to refine the resultant ideas.

2.1.5 Stage Four: Idea expression

While the previous three steps provide a basis for understanding the internal cognitive processes that might lead to creative idea generation, under the ‘socially valued products’ definition of creativity, favorable cognitive processing abilities or skills are not enough to ensure creativity. Even in the problem definition stage there is likely to have been a strong influence of chance encounters and other environmental stimuli that would increase or decrease the likelihood of creative ideas being generated. ‘Creativity’ requires more than just the ability to generate and evaluate creative ideas internally; those ideas must be expressed and implemented. Given this definition of creativity, research into a vast range of personality factors and environmental conditions is required.

While the range of factors that must be researched to understand creativity is beyond the scope of this particular thesis, the next step beyond the internal creative thinking processes is acknowledged - that of creative expression. Creative expression is a significant issue that must be understood when researching creative thinking processes as the number of ideas a person expresses may be a very small subset of the number of ideas they actually generate. Without acknowledgement of expression issues good measurement of creative thinking cognitive processes can not be recognized.

One key issue in regards to the measurement of the creative thinking process is the extent to which the number of ideas being generated can be measured. There is no point making assumptions about creative thinking processing differences amongst

individuals if our measures are not a true reflection of actual ideas generated amongst respondents. There might be a significant difference between ideas generated and ideas expressed, due to social and personal characteristics of the respondents. This is the issue of idea expression.

Expression Traits

Research has indicated that creative individuals exhibit high levels of self-confidence and a lack of need for social acceptance (Baron & Harrington, 1981; Woodman, Sawyer & Griffin, 1993). This is hardly surprising given that creative ideas, by their very nature of originality, often contradict the norms of the time. Subsequently, in order for an individual to achieve creativity they must possess those traits that increase the likelihood of the expression of their ideas. This is not to say that a person who is not very articulate, or who has difficulty putting into words creative ideas, has fewer creative ideas than the person who possesses these particular abilities. It might well be that a number of great ideas are developed by people, and then others take those ideas and use their skills of expression to gain acceptance. It is also probably true that many creative ideas stay locked away inside peoples' heads. Therefore, in order to understand and measure creative thinking processes we must account for expression limitations in our modeling.

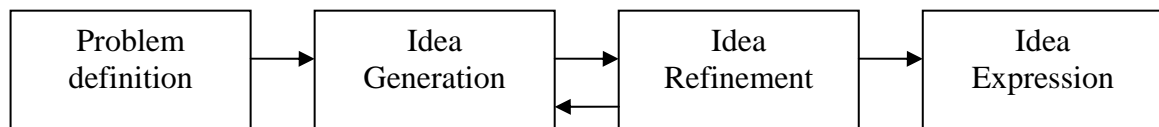
2.2 A Model of the Creative Thinking Process

The literature analysis above leads to a stage-based model of the creative thinking process, which is then extended to account for idea expression. Essentially, for the purposes of this thesis, the creative thinking process involves the three stages of: i) problem definition, ii) idea generation, and iii) internal evaluation. The creative thinking process thus encompasses the internal processes from determining the parameters for the idea search (problem definition) through to the point at which those ideas are ready for expression.

Creativity is then defined as the ability of an individual to develop products or concepts to a stage that they are acceptable to society; because the ideas are both

original and appropriate. This much broader definition encompasses the individual creative thinking processes outlined above, but extends to include issues of idea expression and environmental influences. As the focus of this thesis is primarily on internal factors, and in particular on the influence of existing domain-specific knowledge and creative thinking techniques on creative thinking processes, these environmental influences are not extensively referred to unless they have a direct bearing on the measurement of the factors under study, as is the case in idea expression. In addition it is acknowledged that an individual may develop ideas that are original and appropriate at a personal level, but that those ideas may not be original or appropriate at a societal level (refer Chapter 3).

Figure 2.1: The Four Stage Model of Creativity



2.2.1 Stage One – Problem Definition

This step influences all subsequent steps, and is affected by our domain-specific knowledge. Research by Rieter-Palmon, Mumford, Boes and Runco, (1997) found that the way in which we construct problems influences our answers.

2.2.2 Stage Two – Idea Generation

Stage two involves divergent thinking, or cross category linkages. This stage is strongly influenced by how the question was framed and therefore the starting points from which idea combinations occur. At this stage more original ideas will result if the internal anchor points set by the question definition are broader, thereby allowing more distant associative links. Divergent thinking techniques are likely to have a strong influence on the originality of ideas generated.

2.2.3 Stage Three –Idea Refinement

Having a creative idea in itself is not enough to achieve creativity. The appropriateness of the idea will be determined by peers in the domain and hence a person must be able to refine their ideas to a level that is acceptable to others. Idea refinement is the process of extending category links and providing justification or explanation for the creative idea within the domain.

2.2.4 Stage Four - Idea Expression

This final stage of the model relates to the abilities, such as language skills, resources, and self-confidence, which allow the creative ideas to gain acceptance. Subsequent, to the issue of idea generation and internal evaluation will be the process that then takes those ideas and brings them to society as a whole. This fourth stage means there are very few creative genius's within society at any given time because to attain idea acceptance requires a great many resources and abilities that the majority do not possess. Subsequently, while most, if not all people, might have creative thinking abilities, it might be that we recognize only a tiny fraction of those ideas given the constraints operating at this stage of the creativity process.

The proposed four-stage model is an extension of existing models and methods of measuring creativity. The three main creativity measures that were introduced in chapter one have had numerous critiques over the years and a number of measurement issues have been identified. Attempts at measuring creativity have resulted in more questions than they have answered and many problems are still encountered. There is little point developing a new model of creative thinking unless the measurement issues of the past are first addressed.

2.3 Measurement Problems in Creative Thinking

One of the biggest problems facing the field of creativity is the difficulty in its measurement. From the Guilford Aptitude Research Project (ARP) the Torrance test of creative thinking was developed. This measure has provided one of the key methods of testing individual creativity, from kindergarten through to graduate

students, and is still widely used in creativity research today (Mouchiroud & Lubart, 2001). It uses a battery of verbal and pictorial tests and has been extended to include sound and movement tests. It measures a variety of different factors that theorists believe require very different abilities; fluency, originality, elaboration and flexibility. However, the tests do not appear strong as measures either; of creative accomplishment, or of inherent respondent ability in the four factors being measured.

Torrance Test Limitations

Not least of the limitations in relation to the Torrance test, and related measures, is the relatively small correlation between test scores and later creative performance: “Creative abilities as measured by tests of divergent thinking predict later creative performance with correlations typically ranging in the 0.2 to 0.3 range” (Sternberg & Lubart, 1996, p.678).

Another of the major limitations of the Torrance test is that results on the four constructs being measured: fluency, originality, elaboration and flexibility, do not show high levels of reliability between tests (Antastasi, 1986). A respondent might score highly on originality (and in fact on 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 labeled scores (e.g., Fluency) derived from different tests” (Antastasi, 1986, p.409).

The reasons for the poor inter-test correlations might be that the four constructs are task specific (Baer, 1993), based upon different cognitive process strategies being chosen by respondents, and/or that the test is not able to capture inherent abilities. It would seem that the test itself does not capture differences in individual creative cognitive abilities adequately; rather the results may indicate that respondents are able to choose different cognitive thought processes to suit different situations and this results in higher or lower scores on the four constructs across tests. Given that the test is probably the most widely used measure of creative thinking ability this is an area where further research is essential.

A related issue with the Torrance test is the effect of the time limit placed upon respondents. “As in the ARP tests, speed is an integral part of performance on the Torrance tests” (Antastasi, 1986, p.409). Given time pressures respondents might well choose different types of cognitive response strategies based upon what they assume the experimenter is asking for. These choices might not reflect actual creative thinking strategies under normal circumstances. A respondent might therefore, for example, focus on divergent idea generation strategies and score highly on flexibility and statistical rarity factors, while poorly on the fluency factor. Additionally, it could be argued that given divergent cross-categorical mental processing is required in order for the combination of mental images in a new way, this process might well take time and require cognitive processing that might not usually occur in a test type environment. Finally, the test setting may not motivate respondents the way an actual problem might.

Evaluation Issues and Creative Thinking Measures

Research by Amabile (1996) found that extrinsic motivators result in less creative responses than if motivation is intrinsic. Additionally, Kover (1995) found that external evaluation was destructive to the creative process. These results might be explained by the fact that extrinsic motivators and evaluations result in the assumption of some type of required response that limits divergent thinking by the respondent. The creative thinking model suggests that evaluation works to limit the problem definition stage and results in a narrow search model. Subsequently, respondents faced with evaluative pressures are less likely to look at highly divergent cross-memory categories to find a response. Their responses therefore will be less original, although they might be more appropriate.

While Torrance has tried to overcome the evaluation problem by stating that the tests need to be viewed as activities rather than tests, evaluation might also affect the cognitive strategies chosen. Experimental conditions that provide evaluative cues might result in a narrowing of the problem definition and a focus on associative thinking processes rather than bisociative or divergent cross-category memory processes. In any task if we set the evaluation criteria early it might limit our ability to generate divergent ideas by limiting the anchor points or mental elements we bring up

to generate those new ideas. The issue is often reflected in work setting, such as occurs in the advertising agency setting.

2.3.1 Overcoming Evaluative Pressures – An Example

Evaluative pressures, and their limiting effect on divergent thinking, are a potential explanation for the common battle between creatives and account planners in the field of advertising. Advertising is a classic example of the conflict created by the requirement that ideas must be both original of ideas and appropriate. Furthermore successful advertising is not just a matter of having good creative ideas - it is being able to attain acceptance of those ideas. Gaining idea acceptance is usually achieved by producing ideas that are appropriate to the target audience. A good advertising campaign usually requires an original idea to grab attention as well as an appropriate message that allows the target audience to see how the company's products or services meet their particular needs and wants. Like the stages in the creative thinking process, these two areas are often in conflict.

The advertising industry provides a solution to the problem that could also shed light on the issue of how to encourage potentially conflicting cognitive creativity processes. Advertising agencies separate out the idea generation stage, and the idea evaluation and refinement stage, by having different people perform them within the organization - and at different stages within the development of a campaign. In relation to the model, this has the effect of ensuring that evaluation does not limit the problem definition stage and setting the anchor points, and it also allows idea generators to focus and specialize in developing highly divergent original ideas, rather than having to try to undertake both divergent and convergent processing at the same time.

An additional advantage of specialization in the creative thinking process of advertising agencies is that it allows creatives to learn and develop techniques that will enhance their generation of highly original ideas. Those creative techniques might act to redefine or expand the anchor points that act as search parameters. Any task situation, irrespective of whether it is an experimental condition or a work task, will result in stimulus-related cues that limit the anchor points and might not be

overcome until divergent processing strategies are employed. Such strategies might well reflect creative thinking techniques and hence could be inserted into the processes without the need for an incubation period.

However these divergent processing strategies do not overcome the problem of subjective evaluation. In fact it could emphasize the problem of good idea rejection, because the people who develop the ideas are different from those who then determine their appropriateness. “A creative idea must be appropriate, but this is often difficult to recognize because it might violate conventional logic and have a logic of its own” (Runco & Charles, 1993, p.545). When we evaluate creative ideas we do so based upon our own domain specific knowledge. This leads to issues relating to the subjective evaluation of appropriateness criteria.

Stage Based Measurement

A related limitation of the Torrance test of creative thinking relates to the fact that it measures two types of cognitive processes. “The non-significant outcomes of ratio score measures suggest that traditional flexibility measures were confounded by fluency measures” (Johns & Morse, 1997, p.1). It might be that the cognitive processes that are required to develop flexible and original outcomes are different from those required for evaluation of ideas or fluency measures. The model proposed in this chapter states that each should be defined as a separate step as they are two distinct cognitive processes. The idea generation stage might require bisociative, cross category divergent thinking processes, while the internal evaluation stage requires more associative knowledge-based evaluative processes.

Essentially, the Torrance measure attempts to capture stages two and three of the proposed model of the creative thinking process. Stage one is not measured because the questions are set by the researcher. The tests measure abilities in idea generation, originality, and flexibility, as well as internal evaluative processes, fluency, and elaboration. However, if the respondent makes assumptions as to whether the tester is wanting original versus appropriate responses this might influence the type of processing strategy chosen and hence the respondent’s outcomes. Indeed, research has

shown that merely adding the term ‘creative’ into instructions influences respondent’s responses (Harrington, 1975)

A final issue with the Torrance test is that it could be the cognitive strategies of individuals away from a particular task are more influential in the development of original ideas than those strategies used during the initial period of problem definition and idea generation. A creative individual might be better able to: think divergently, reflect; be open to; and integrate divergent information to a particular task that they hold in memory. A more appropriate measure of these types of abilities, than the battery of tests used in the Torrance measure, would be remote associative ability measure Mednick (1962). Flatter association hierarchies across different domains would reflect a person’s ability to accept and integrate a broader range of information when faced with any given situation or problem.

2.3.2 Mednick’s Remote Association Test (RAT)

Mednick (1962) developed a theory of creative thinking that incorporated the concept of associative hierarchies. 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). While the RAT has been used in “... 1844 articles between 1965 and 1987” (Coney & Serna, 1995 p.112), the studies that have tested the validity of the RAT have not shown strong relationships between creative accomplishment and the RAT scores. Hence, while

associative thinking processes may be 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. 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. Indeed, 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.

Additionally, given the complex nature of creativity and the number of factors, both internal and external, which influence the potential for successful creativity, the poor performance of the RAT is hardly surprising. Remote associative abilities are likely to assist in the creative process only during problem definition and idea generation and hence should only be used to explain part of the creative process. Consequently the RAT's many methodological limitations means it is no longer used as a creative measure. So while associative abilities may be crucial in understanding individual creativity and creative processes, an alternative measure is needed to determine the influence of associative hierarchies on creativity.

Remote Associations and the Four Stage Model

Mednick's theory relates best to the stage of idea generation, because it is concerned with people's ability to think divergently or make remote associations. The ability to combine disparate mental images should result in statistically rare results; however, these statistically rare results might be a result of knowledge and the repetition of

existing memories, rather than the generation of original ideas through the combination of cross category memories. Given the problems with the Torrance test and the RAT it would be tempting to fall back on the 'novel, socially acceptable' measure, or to rely on expert judgment of relevant tasks to measure individual creativity. However, even these methods still leave issues with regards to judging the extent to which ideas are original and appropriate.

2.3.3 Appropriateness Measurement Issues

As stated by Guilford (1968) creativity measures require both correctness measures that tend to be categorical, and goodness of response measures that are subjective. There is a problem with evaluating creativity using measures of correctness. Correctness assumes we know what is right to start with. "Appropriateness might be an important aspect of creativity, but the present results suggest that there are semantic and measurement issues that must be added in future research" (Runco & Charles, 1993, p.545)

Appropriateness can be defined as: doing things that are suited to the situation. Therefore an appropriateness measure needs to identify ideas that are seen to be suited to the situation. The critical issue is how to determine whether an idea is suited to a situation or not. When a person judges a response, they evaluate that idea based upon their own domain-specific knowledge. Appropriateness therefore relates to a person's knowledge of situations. A completely new idea is hard to judge as appropriate because people will base their judgment on past information that may no longer apply. As the environment changes so also do our appropriateness criteria. If a person two hundred years ago were to respond to the problem of getting across the ocean with 'fly', that answer would be rated as original, but bizarre and inappropriate. The same answer today would rate as appropriate but unoriginal.

Domain Specific Knowledge and Appropriateness

Judgments involve searching our existing domain knowledge to identify whether an idea is suitable to the situation (or in the case of some experiments searching the criteria set out by the primary researcher). If existing knowledge does not provide a

basis for connecting a new idea with the situation, it will be viewed as inappropriate. In fact, the stronger a person's knowledge of the existing domain the more likely it might be that they find significantly more internal information that results in an inappropriate evaluation of the new idea. Creative ideas, by their very definition, are therefore unlikely to be evaluated as appropriate. The more original they are, the more likely they are to be evaluated as inappropriate.

Most people would agree that ideas such as the airplane or the telephone were amazingly creative ideas when first thought of. So from a consensual basis there would be agreement on their creativity. However, at the time those ideas were first developed they would have probably been viewed by most as being bizarre and even ridiculous. This is illustrated by the following quotes;

What can be more palpably absurd than the prospect held out of locomotives travelling twice as fast as stagecoaches?

The Quarterly Review, England (March 1825)

That the automobile has practically reached the limit of its development is suggested by the fact that during the past year no improvements of a radical nature have been introduced.

Scientific American, Jan. 2, 1909

Heavier-than-air flying machines are impossible.

Lord Kelvin, ca. 1895, British mathematician and physicist

There is no need for any individual to have a computer in their home.

Ken Olson, 1977, President, Digital Equipment Corp.

Therefore, does this mean we can only evaluate creative outcomes (i.e. products or ideas) that have already been accepted by society? If this is the case, then it does not assist us in determining how creativity can be developed, as we will rarely get close to the moment of inspiration. Moreover, creative products are not necessarily a true reflection of all of the creative thinking processes.

Divergent Thinking Tests and Appropriateness Measurement Problems

Tests such as the Torrance test of creative thinking require that results are evaluated for their appropriateness. This is a difficult area, because it requires a subjective evaluation based upon limited information from the respondent. For example, if we take the test question: 'Provide as many responses as possible for 'Fluids that will burn?' (Anastasi, 1986, p.406), and 'gold' is given as a response, how would it be evaluated? Gold can be a fluid and it can burn people, so can lava and molten lead and

acid. These are examples of creative ideas that an evaluator might not view as appropriate unless they are able to see the context in which they are being applied. Here 'burn' has been taken out of the normal context of 'being able to set fire to' and changed into the context of 'scald or cause injury'. Therefore, it is a very creative response that might not be judged as creative.

In this particular example it is quite easy to see the different context of the response, but for many creative responses they might be so different from the judge's evaluative criteria that it is extremely difficult for them to see the connection and their relevance. Because highly original and appropriate ideas are presumably very rare, and also highly valued, the chances of identifying them in a respondent is limited.

Product Measurement Problems

A creative product could be attributed to an individual with strong self-confidence and expression skills, but the product might have been the result of someone else's idea generation abilities. It is likely that the recognized 'inventor' would not even be aware that they were not originally responsible for the divergent thought processes that resulted in the idea generation. The recognized 'inventor' might in fact have very weak idea generation abilities, but is in a position, and has the resources, to excel by recognizing and expressing ideas. There has been a long tradition of song and TV scriptwriters whose work is generally attributed to the artist and not the writers (Kasof, 1995). While measuring creative thinking abilities using proxy, recognized product type methods, has its problems, tests of creative thinking processes are also laden with limitations.

Internal Appropriateness Evaluation Issues

Not only will this problem of appropriateness evaluation have the potential for limiting judgments of creativity from the perspective of an external judge, the same judgment limitations are likely to occur at the internal evaluation stage. We use our existing knowledge to evaluate new ideas internally in much the same way that an external judge would evaluate new ideas. Too much knowledge would in fact result in the same internal evaluation constraints as occurs in external judgment. Too much learned knowledge of an area will mean that divergent highly original ideas are self

evaluated as bizarre and inappropriate. Our own knowledge might act to discourage creativity, especially if the memory category is so well developed it leads to automatic processing in response to a situation. In this case the expert will find a solution that is good enough early, and they are not, like the novice, forced to look to divergent cross category memories for a solution.

2.3.4 Measurement Issues with Originality

One of the interesting questions in the creative thinking research is: ‘Where do creative ideas come from?’ Most research points to the conclusion that creative ideas are the result of the combination of disparate or cross-domain mental elements. Therefore creative idea generation is a matter of a person being able to make internal connections between ideas that are not normally associated with one another. The more diverse the domains that are connected, the more original the idea, but the less likely that it will be viewed as appropriate. It is not a matter of doing things entirely new, but combining ideas in a new way.

Originality can be defined as: combining ideas in a way that is new. Therefore, an originality measure is an evaluation of the ‘newness’ of the combined ideas. The originality measurement problem relates to the scope of measure. Should creative thinking and creativity be measured from a societal or individual basis? If a person was to develop their own theories on creativity without reading the existing literature, but through internal combinations of mental elements available to them from past experience and other domains of knowledge, are they being creative even if those ideas are the same as can be found in the literature of the creative research domain? Again, it is important to distinguish between creative thinking processes and creativity.

Individual versus Societal Level Originality

In the scenario above the person is able to generate ideas that are new combinations of mental images and is therefore undertaking the creative thinking stage of idea generation. The person is not, however, enabling creativity to take place, given the definition of creativity as requiring ideas that are new and valued at a societal level.

For this to occur those ideas must be combinations of ideas that are new at a societal level. Those ideas must also be expressed and subsequently valued.

This difference between societal-level and individual-level creativity has measurement and development implications. When measuring ideas that are developed by respondents it is impossible for a judge to know if that idea is new at an individual level or not - through just looking at the idea itself. The idea might be the repetition of an existing memory if provided by an expert, whereas it might be a completely new combination of divergent memory categories if provided by a novice. If the idea is judged for originality in both cases it might be evaluated as moderately creative, when in the first case it required no divergent cross-category memory combinations and in the second case it required quite extensive divergent cross-category mental combinations.

One way to overcome this difficulty of external measurement is to have people evaluate their own ideas for originality. This leads to its own set of measurement biases especially given the complex nature and limited understanding of creativity as a construct. Another method would be the careful screening and selection of respondents based upon their knowledge and expertise in different domains.

If we were to take a societal view of creative thinking then we would say creative thinking is a new way of looking at information for society, and creative thinking would be a very limited area. However, another way of looking at creative thinking would be to focus on creative thinking processes separately from creativity. Creative thinking processes would then focus on the individual perspective. If it is a new way of looking at information for that individual then it is creative. This has significant implications for education systems. If creativity must be both original and appropriate then we must break up the creative process if we are going to succeed in developing it. If appropriateness of response, or societal level creativity, is emphasized then we will obtain students with a strong base of knowledge but an inability to view problems from alternative angles. If individual creative thinking processes, or originality, are emphasized, then our education systems will not be easily able to measure student differences. Therefore, a critical question will be: at what stage do we bring in evaluation in education?

2.3.5 Combined Measurement Issues – Originality and Appropriateness

It is little wonder creative individuals are so hard to find. They must be good at both divergent and convergent processing. Additionally, planning and knowledge skills can limit original thinking by setting the first step, problem definition, too stringently. Unfortunately our current measures of creative thinking focus on appropriateness and originality in the same measure. Therefore, they might identify individuals who are knowledgeable, but inflexible, in their thinking styles. Such individuals might not have exceptional ability to think creatively, i.e. match different memory categories, in fact quite the opposite.

This leads to an interesting problem when we try to measure both originality and appropriateness in the same test. Creative thinking might be the result of three distinct steps that could be in conflict and limit one another. If we measure appropriateness at the idea generation stage of the creative thinking process we limit originality, as the respondent limits their cross domain thinking processes and focuses on the focuses on the memory categories related to appropriateness. We need to break up the creative process and measure the aspects separately.

Guilford (1968) stated that we are under-recognizing creative individuals in our school systems. This is hardly surprising as our school systems are judgment-based and therefore are more apt to measure appropriateness rather than originality. Intelligence usually catches the appropriateness criteria, and frequently the originality criteria. The school system encourages appropriate thoughts based upon pre-determined search criteria rather than originality, which is harder to quantify. The schooling process makes us set stringent search models very early and often leads to structure. This has interesting implications for the teaching and assessment of minorities in our classrooms. If teachers do not understand those students' different frames of reference then they will assess them based upon criteria which reflect the appropriateness of the results based upon their own understanding and memory categories in this situation, subsequently, highly creative individuals could well become de-motivated because while their ability to learn is strong their divergent

thinking abilities are not appreciated (Baldwin, 2005; Diaz-Lefebvre, 2004; Guilford, 1968).

2.3.6 Idea Expression Measurement Issues

Creativity is based upon what is valued, new, and appropriate. Achieving creativity, however, requires more than merely the ability to come up with such ideas; it requires strong communication skills and abilities in addition to the internal creative talent. You might well have to be a genius to be creative, not so much in that most people cannot think creatively, but in the fact that few people have the range of skills, or personality characteristics, required to take an idea all the way to social acceptance. “The excitement of actualizing a dream frequently recedes with the need for changing one’s hat from inventor to business and finance manager” (Soll, 1982, p.22). When it comes to creative genius, that genius might be more a result of self-confidence than intellect.

The problem of idea expression has been realized to a certain extent in creative thinking measurement. The Torrance test tries to remove some of the pressures through referring to tests as ‘activities’. Researchers such as Torrance have measured creative thinking using activities that encompass play and fun. Other researchers have provided significant insight into the social dynamics that either support or discourage idea expression (Amabile, 1996; Simonton, 2003). It is critical, therefore, that creativity measures that test the initial three stages of the creative thinking process, try to account for the fact that social and personality characteristics might limit the number of ideas being expressed by certain individuals. If this factor is not considered creative thinking abilities amongst some respondents could be erroneously under-measured.

If we define creative thinking as generating useful ideas then we get into problems because we could restrict people from undertaking the process of creative thinking as they will only provide ideas that they think will be evaluated positively by the judges. They will not suggest ideas that are too divergent unless they are in a very supportive environment amongst people they trust, and in an environment that does not have

norms that lead to conformity and people merely following the lead of the dominant individual in the group (unless they are non-conformist individuals) – a hard task indeed.

2.4 Big C versus Little c Creativity

A problem with creative thinking is that not all creative ideas are created equal. Some ideas are undoubtedly both more original and appropriate than others. However, some of the most significant academic findings of the last century were not a result of highly divergent cross-domain combinations, but rather new combinations of information from within a domain of knowledge. These differences in types of creative thinking are the focus of the next chapter because there are important implications regarding how different types of creative ideas, Big C vs little c ideas, are generated and measured. Of particular interest is the influence of domain-specific knowledge and creative thinking techniques on different types of creative ideas. These issues are addressed in the next two chapters.

It may be that at least some types of creative ideas are not the rare exceptional ideas that many researchers purport for them to be. Indeed, as the research has continued to develop, more and more researchers are acknowledging the proposition that at least part of the creative thinking process may be a common human ability that can be enhanced through training.

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3.0 The Creativity Debate

Despite the lack of consensus in the creative thinking debate, theorists continue to explore a number of significant findings and conceptual developments. Three important conceptual developments in the creativity literature relate to: a) divergent thinking, b) the degree, or relative eminence, of creative ideas – big C versus little c and, c) domain-specific knowledge. The aim of this chapter is to merge these three conceptual areas in order to develop a model that defines the different creative thinking processes - and can act as a basis for measurement.

3.1 The Creative Thinking Process – Divergent Thinking

One area of general agreement in the creative thinking literature is that for an idea to be creative it must be both original and appropriate (Jackson & Messick, 1967; Mumford & Gustafson, 1988; Kasof, 1995; Amabile, 1996; Ford, 1996; Mumford & Simonton, 1997; Runco, 2004). However, there is still significant debate on what constitutes the creative thinking process and what represents a creative idea. 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. Owens (1969) - “...skills in combining and reorganizing those parts was positively related to patent awards and superior's evaluation of creativity obtained 5 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.

Creative Thinking Definition

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 encompasses many of the areas of at least partial agreement in the literature, and also addresses another area of debate (Sternberg & Lubart, 1996) - whether or not there is a difference in the creative process when developing major versus minor creative ideas. The definition addresses this area by accounting for differences in the magnitude of creative ideas with the words: 'either across or within domains'. This provides a basis by which this difference can be explained - that is through an analysis of how ideas are combined, either within or across domains.

3.1.1 Eminent Big C Creative Ideas versus Minor Little c Creative Ideas

“Ghiselin (1963), noted that psychological processes underlying the production of major contributions, ... may not be equivalent to the processes underlying the production of minor contribution” (as cited in Mumford & Gustafson 1988, p.28). Besemer and Traffinge (1981) discussed differences in significance by stating that major creative products transformed the manner in which the audience perceives the world. Mumford and Gustafson (1988), suggested that the difference between eminent contributions and minor contributions may be that the former entailed the integration and reorganization of cognitive structures, while the latter was related more to the extension of existing cognitive structures. Perkins and Salomon (1988) noted that connection of similar ideas resulted in incremental developments that differ from that of major discoveries. Gardener (1993) distinguishes between everyday small c creativity and big C creative breakthroughs. Weisberg (1999) discusses differences in

creative ideas as true creative ideas being a break from what has come before. Hence it is acknowledged that there is a significant difference between types or eminence of creative ideas. How, and what, cognitive structures are integrated can provide a basis for understanding those differences.

Cognitive Differences in Big versus Small C Idea Development

One piece of research that can assist in understanding the cognitive differences in big C versus little c creativity is Schilling (2005). Schilling proposes, in her 'small-world' network explanation of cognitive insight, that insight occurs when an atypical association is made through random associations. While Schilling notes that insights helps us to solve both day to day problems, and acts as a basis for major scientific breakthroughs, the network model provides a basis by which connections of category elements based upon their degree of atypicality can explain major versus minor contributions. Ideas that are the result of more distant, or atypical, connections will result in more novel ideas than those that are the result of more typical connections, or part of the same category.

Essentially, in relation to Schilling's small world theory of insight, an insight or aha moment occurs when a person makes a previously unconnected unusual or atypical association. Then this new combination provides a short-cut for a whole lot of new connections between memory pathways to occur. As described in her article, a new connection for a child might be a significant new insight leading to a range of new connections, while that same insight would not be viewed as significant to an adult. This emphasizes the differences between individual and societal level creativity. For an idea to result in a big C breakthrough then atypical memory connection must be made between memory categories that have not been associated in that way before from a societal perspective.

Age and Creative Eminence

An additional significant piece of work related to the eminence of creative ideas, is the work of Lehman (1953). This work is cited here as it provides an insight into the importance domain specific knowledge might play in the degree of eminence of the

creative idea generated. The work by Lehman analyzed the age at which individual's accomplished different types of creative achievement and "...found that major contributions were most likely to occur in young adulthood, whereas minor contributions and net productivity were most likely to peak in middle age" (Mumford & Gustafson, 1988, p.29).

A conceptual review of the literature undertaken by Mumford and Gustafson (1988) identified a range of potential reasons for the Lehman finding. Included in their findings were that major achievements may be: a) linked to young people's redefinition and reorganization of concepts due to a need to incorporate findings that were not explained well in the current field, b) the concern by younger people to develop findings that fit in with broader societal needs, c) the limited experience of people new to a field meaning young people are more amenable to restructuring new information and combining it with the domain, and d) the fact that young adulthood is a time of significant change and accommodation.

Hence, combining the separate conclusions reached by Ghiselin (1963), Besemer and Traffinge (1981), Mumford and Gustafson (1988), Gardener (1993), Perkins & Salamon (1988) and Weisberg (1999) - that minor and major creative contributions may be the result of different cognitive process, with the research of Schilling (2005) and Lehman (1953), and in particular Lehman's second and third points, it is posited that domain knowledge, and the extent to which new ideas involve the combination of highly dissimilar domains, is a reasonable basis for the analysis of the degree of creative contribution of an idea. It does not, however, fully explain another finding by Lehman; why major contributions reduce, and minor contributions peak, in middle age.

The Mumford and Gustafson (1988) article put forward a number of arguments related to this finding including; a) the findings by Neugarten (1968), and Gould (1978), that middle age brings an awareness of death and the focus on more attainable goals b) middle aged people have a strong knowledge of the issues facing the domain and therefore are in a position to address those problems, and c) well-developed cognitive structures may limit divergent combination of ideas due to their stability and automaticity of use (Barsalou, 1983). These findings, particularly points b and c,

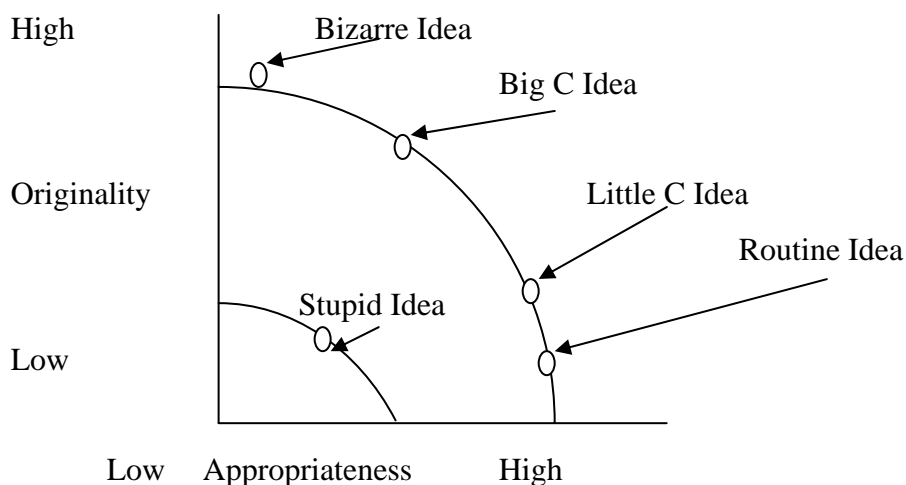
support the contention that there are differences in cognitive processes undertaken in the development of major and minor contributions, and these differences relate to how domain knowledge is combined.

So while it is accepted that creative ideas are the result of some sort of divergent thinking process, combined with reorganization or combination processes, the process may differ for different degrees of creative outcomes. Authors, (Briskman, 1980; Ghiselin, 1963; Gardener, 1993; Sternberg & Lubart, 1996) refer to this concept of varying degrees of significance of creative ideas, using the terms ‘eminent’ versus ‘minor’ creative ideas. For the purposes of this thesis the terms big C, and little c, creative ideas are used.

Defining Big C versus Little c Ideas

Nevertheless, there have been few attempts to define exactly what constitutes an eminent creative contribution versus ideas of a more limited contribution, or if, and how, their development requires different cognitive strategies and processes. The best way to describe the difference between the significance of creative ideas may be a continuum that relates the accepted creativity constructs - originality and appropriateness, with the concept of domains. For an idea to be creative it must be perceived as being appropriate to the domain (Ford, 1996; Amabile, 1996). Additionally, the degree of perceived originality will vary dependent upon how similar that information is to an existing domain knowledge.

Figure 3.1: The Creativity Frontier



3.2 The Creativity Frontier

The above creative frontier diagram can illustrate the basis for defining the degree of eminence of creative ideas. Big C ideas involve combining memories from different domains in a way that results in highly original and moderately-highly appropriate responses. As these ideas are likely to go beyond the current thinking in the field, they might not initially be viewed as highly appropriate. Small c ideas involve combining memories from similar domains in new ways that result in ideas that are highly appropriate but that will be viewed as only low to moderately original responses. Ideas that are merely the repetition of existing knowledge will be neither original nor appropriate - habitual idea. Ideas that are the result of combining new domains in ways that result in highly originality but inappropriate will be viewed as merely bizarre ideas.

While creative ideas require at least some degree of recombination that is different from what has been done before, the continuum positions combinations that involve memory categories within the same domain of knowledge as less original than those that combine highly dissimilar domains. These highly dissimilar domain combinations will change the parameters of the field itself, as these ideas will link cross domain knowledge. How these cross domain combinations occur will be discussed in chapter 5.

Subsequently, in line with the conceptual underpinnings of Lehman (1953), Ghiseling (1963), Besemer and Traffinge (1981), Mumford and Gustafson (1988), and Gardener 1993, big C creative ideas and little c ideas may be the result of different cognitive processes. In line with the domain based definition proposed, it is contended that big C ideas are the result of the combination of category memories from dissimilar domains, while small c creative ideas are the result of combining ideas from within the same domain in a new way. Essentially the difference in eminence of ideas relates to the extent to which the ideas merge dissimilar versus similar domains.

3.2.1 Domains and Creative Thinking

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. In addition there are obvious connections between various areas of conventional wisdom or study, for example, marketing and sales. Therefore, the concept of a domain may be best described as a continuum of related concepts, with some domains more closely related than others. This provides a description of domains of knowledge that can assist in developing a sound understanding of the creative thinking process.

Figure 3.2: The Domain Continuum



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). Therefore, creative thinking is initially a process of divergent thinking, and subsequently, of idea evaluation, refinement, and finally expression (refer Chapter 2). However, the vast majority of 'new' ideas are probably the result of people making connections between mental elements that would fall within the boundaries of a societal domain rather than combinations from very disparate domains. Indeed, Schilling's (2005) 'small world' network model proposes that the world is indeed a small place and, given that there are certain central nodes in memory, then most nodes will be connected by a relative short path length. Subsequently, while highly significant breakthroughs may require the connection of different domains - undoubtedly similarities will exist across them.

Therefore, this difference between the combination of similar and dissimilar domains acts as the basis for the generation of big C or little c creative outcomes. The cognitive

processes and strategies that result in dissimilar versus similar domain combinations may be significantly different. However, it is important also to make the distinction between creative thinking processes and creative outcomes, and this is largely dependent upon memory category combinations versus domain combinations.

3.2.2 Categories and Domains

There is a difference between memory categories and domains. Categories are essential for understanding the individual cognitive processes that may or may not result in creative outcomes. Everybody has their own category knowledge that will differ at least slightly from that of other people because it is learned based upon their individual experience of the world around them. These categories will be similar, but not identical, to domains of knowledge, and it is these societal ‘domains’ which will be used to determine whether an idea is creative – both original and appropriate. For the purposes of this research, categories will be referred to as either: thought categories, or individual domain knowledge.

Individual Creative Thinking Processes versus Societal Creativity

An individual may undertake creative thinking processes in so far as they are merging mental elements, or thought categories, from their memory to create a new combination. However, from a societal-domain perspective those ideas may not be original and therefore will not be viewed as creative. Boden (1991) discusses this in relation to psychological (P) and historical (H) creativity. Here P creativity is where an individual develops a new idea, irrespective of whether anyone else has developed that same idea. As long as the idea is new at an individual level it is P creativity. H creativity is ideas that are entirely new to humanity and hence no one else has made that combination prior to that H idea. From a measurement and developmental perspective it is important to recognize that there could be a significant difference between creative thinking processes and creativity.

Creative thinking processes might be occurring, but the results from those internal processes might not result in creative outcomes. Essentially, there is a need to recognize the difference between individual creative thinking processes and society-

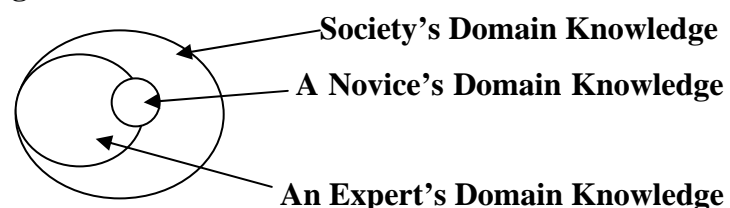
level creativity (refer Chapter 2). An individual could be combining their own thought categories in new and original ways, but if these idea combinations are not new to the domain they will not be perceived as creative by society.

3.2.3 Measuring Individual Creative Thinking Processes versus Societal Level Creativity

Ideas can be gauged as to their degree of creativity based upon the extent to which they differ on the two attributes, originality and appropriateness. However, a limiting factor will be the fact that domains of knowledge are not fixed entities and knowledge of domains differs from person to person. Because groups of people will have differing levels of domain knowledge that they use to evaluate the degree of originality and appropriateness of ideas, each group will have a slightly different view of the degree of both the originality and the appropriateness of an idea (Hocevar, 1981).

This contention is in line by the findings of Koslow, Sasser & Riordan (2003) who found that different types of advertising employees had differing views on what constituted appropriateness. At a societal-level, with total knowledge of a domain, hypothetical ideas could be evaluated objectively as to the degree to which they bring in information from more distant domains. However, this is purely hypothetical, since we cannot evaluate ideas based upon the sum total of society's knowledge at any moment in time.

Figure 3.3: Domain Knowledge Boundaries



Everyone's individual domain knowledge will differ and be a subset of society's aggregate domain knowledge. This causes difficulties for the measurement of creative ideas. When we evaluate creative ideas we do so based upon our existing knowledge

of the domain - our related memory category. Subsequently, the more knowledge we have of a domain the less likely we are to evaluate the ideas of novices as original. This is because of the greater likelihood that we already possess knowledge of a similar solution. Therefore, even if those novices are combining domain knowledge in a new way at an individual level, and therefore undertaking creative thinking processes, the expert might not acknowledge those processes. We evaluate creative ideas based upon our own domain knowledge and not based upon the creative thinking processes that are being undertaken at an individual level by the idea generator.

Domain Specific Knowledge Based Evaluation of Originality and Appropriateness

If a person knows of a solution and someone else provides that solution as a creative response then that idea would be evaluated as unoriginal and therefore, uncreative. If they were unaware of that response they would evaluate it as original. Subsequently, the measurement of 'originality' is often a subjective evaluation that does not necessarily reflect an idea generator's creative thinking processes. Using expert judges to evaluate creativity then requires a determination of how the judge's knowledge biases their evaluation of a respondent's creative abilities.

Additionally, the appropriateness criterion is also a subjective criterion (Koslow, Sasser & Riordan, 2003). Any response will be evaluated based upon the judge's existing domain knowledge. An expert in one particular domain is likely to evaluate the appropriateness of an idea based upon how it fits in with their domain-specific evaluation criteria. Therefore, a creative marketing response might not be evaluated as appropriate by an expert accountant - using cost based criteria, whilst another marketer might evaluate that same response as appropriate - using customer retention criteria.

Internal Evaluation Issues

This domain knowledge based evaluation process could also have a significant effect on the individual creative thinking process in the areas of problem definition and internal idea evaluation and refinement (refer Chapters 4 & 5). A person with high levels of knowledge of a domain might set highly stringent anchor points during

problem definition that then act as the basis for idea generation and limit their chances of cross-domain thinking. Additionally, in the refinement stage, whereby people evaluate and develop their own ideas before they express them, high domain knowledge could mean that divergent ideas are evaluated stringently and rejected. Subsequently, it is important to separate the creative thinking processes involved in each of the different stages of the creative thinking process (refer Chapter 2). A person could have strong abilities in developing creative ideas, but overly stringent problem definition, internal evaluation of those ideas, and/or weak idea expression skills, may limit their ability to develop creative ideas or gain creative recognition.

At an individual level, highly original ideas will be ideas that merge ideas from domains that are not similar for that individual. Additionally, as groups within society organize themselves into areas of common interest and research, experts in any field will have relatively similar domain knowledge boundaries. Subsequently, we would expect ideas that combine generally accepted dissimilar domains to be viewed, at an aggregate level, as highly original. For a new idea to be a big C creative idea it must be original and appropriate at a societal domain level.

3.2.4 Domain Boundaries

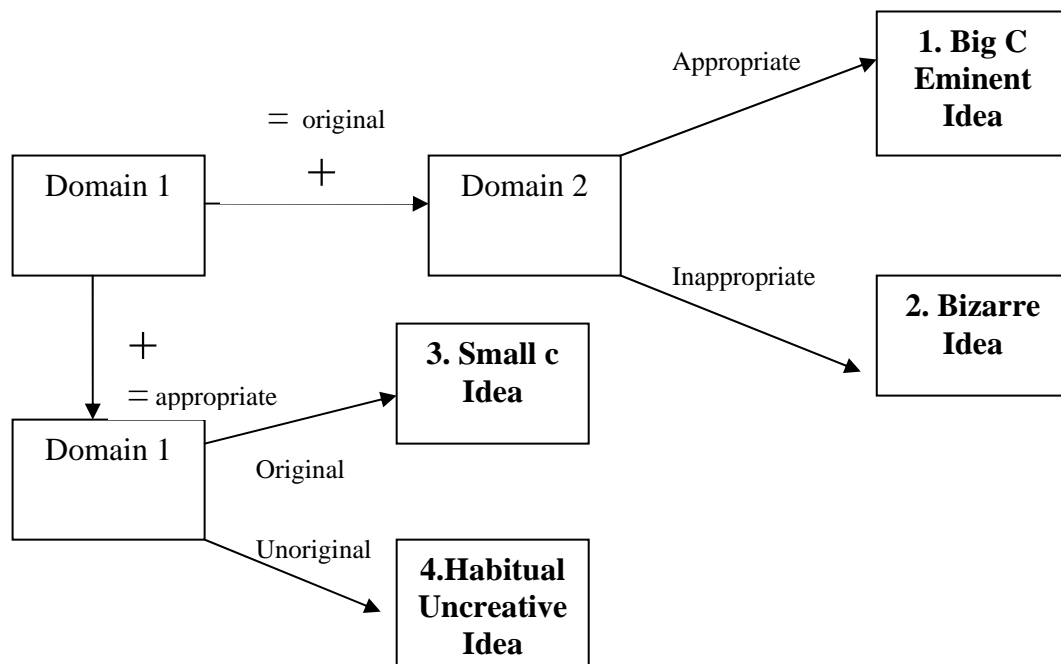
The obvious limitation of this theory relates to the definition of the boundaries of the domain. All ideas and concepts are related to some extent, and it is the extent of accepted difference between domains at any moment in time, at a societal level, that will influence the degree to which a new idea is viewed as original or not. It is a sad fact that the second person to develop the time machine will not be viewed as creative as the first creator, even if they developed the idea completely independently of each other, despite the fact, that as stated by Simonton (2003), these multiple discoveries are usually the result of socio-cultural processes. Indeed, Simonton (2003) noted the phenomenon of multiple discovery; where two or more scientists come up with the same concept simultaneous. Famous examples of multiple discovery include calculus and the theory of evolution (Simonton, 2003).

Putting together concepts that in the past were not viewed as similar will result in the need to change how people organize their thoughts on a domain, and therefore will be viewed by others as highly original. If those ideas can also be shown to suit the context of the domain in which they are being applied, they will also be seen as highly appropriate. In trying to measure the degree of creativity of ideas we therefore need to account for the fact that an idea could be viewed as inappropriate because judges do not have the appropriate alternative domain knowledge with which to evaluate that new idea. This concept, in relation to the importance of field gatekeepers, is discussed by Nakamura & Csikszentmihalyi (2002). In their systems model of creativity the receptiveness of the field is viewed as a critical contributor to creativity. “Everyone is familiar with the case of a creative idea being ignored because the knowledge of the field lags behind that of the creator” (Nakamura & Csikszentmihalyi, 2002, p.339).

These factors have several implications for the study and measurement of creative thinking. First, eminent big C creative processes differ from minor small c creative processes - in that the former combine divergent domains at a societal level, while the latter combine similar societal domain knowledge in a new way. Second, an individual might be undertaking creative thinking processes, but these might not result in societal level creativity. Finally, that the measurement of creative thinking must account for these factors as well as the fact that judges must not only evaluate the creative response, but also the reasoning behind that response as to its appropriateness. The first of these aspects is illustrated in the model shown in figure 3.4, on page 64 below.

The model in figure 3.4 illustrates the four combination options available to a person when generating an idea. What type of idea results from the idea generation process will be determined by whether combinations are made between ideas from within a domain, or ideas from different domains. Additionally, the extent to which those ideas are original or unoriginal ideas, from a societal perspective, will also influence the type of response that is generated. There are four categories of potential response; big C eminent ideas, bizarre ideas, small c ideas, and habitual uncreative ideas. It is important to note that the model is a societal level model.

Figure 3.4: Big C Eminent Creative Ideas versus little c Minor Creative Ideas – Societal Level Model



3.3 Measurement Issues for the Three Approaches

In the creativity literature there are three main measures commonly used in creativity analysis. First, the analysis of eminent creative individuals, identified based upon their track record of developing novel, socially valued products or ideas (Lehman, 1953; Simonton, 2003). The second type of measure is comprised of divergent thinking creativity tests, such as the Torrance test of creative thinking (1974). These tests evaluate the creative abilities of research participants. The third approach is based upon the use of (predominantly expert) judges to evaluate creative ideas developed by research participants (Amabile, 1996). These three measurement approaches can be related to the combination of domains and measurement of different levels of creative ideas – big C versus little c.

3.3.1 The Historic, Eminent People Approach

The historic, eminent people approach identifies product inventors that are widely recognized and uses these people as the basis for creativity research. In regards to the four types of creative idea it therefore only focuses on big C ideas. Moreover, as many

big C ideas are not instantly recognized, given other people may not have the cross domain knowledge to evaluate those 'new' ideas, the consensus approach does not analyze big C ideas until long after the idea generation process has occurred.

3.2.2 Creativity Tests

Creativity tests commonly use constructs, such as those of the Torrance Test of Creative Thinking (1974) - fluency, flexibility elaboration, and originality. These tests require participants to state responses to set questions within a strict time limit and then evaluate all of the responses based upon pre-set criteria such as:

- ↗ Fluency – total number of relevant responses
- ↗ Flexibility – number of difference categories of relevant responses
- ↗ Elaboration – amount of detail in the responses
- ↗ Originality – the statistical rarity of the responses

The fluency measure evaluates a response based upon an agreed basis of its appropriateness, and then all responses are summed. The flexibility measure evaluates all responses given by a respondent in regards to their similarity to one another. The elaboration measure evaluates the amount of detail given by a respondent to a question or task. The originality measure evaluates a response based upon how uncommon the response is. However, 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). There are a number of potential reasons for the test limitations.

It has been assumed that the types of questions in the Torrance Test are not domain-specific, and therefore knowledge effects should not have a strong influence on the scores of respondents. However, Baer 1993; based on the premise that "Studies have shown that cognitive abilities underlying creative performance differ from task to task", (Baer, 1993, p.80), argues that creative thinking tests do not reflect the range of creative thinking abilities needed across different domains. Baer's argument is that creativity is not a function of universal abilities and this contention is supported by the poor performance of respondents across different tasks i.e. mathematics versus poetry. While Baer argues that creativity is domain specific and hence tests such as the

Torrance test will not determine creative potential across domains, other researchers contend that while differences may exist across domains there are certain 'important processing commonalities' (Marsh, Ward & Landau, 1999). Also as noted by Plucker (1998) "Several reasons exist for not placing too much of an emphasis upon divergent-thinking tests (i.e. accommodating various thinking styles...), but the task specificity of creativity is not one of them" (Plucker, 1998, p.181).

Minimum Knowledge Requirements and Divergent Thinking Tests

An alternative argument against the effectiveness of divergent thinking tests is the U shaped knowledge-creativity relationship (Weisberg, 1999). This argument states that a minimal amount of knowledge in a domain is required before creative thinking can occur. Limited knowledge limits the creative processing of a novice in a new task. The high cognitive requirements of idea generation tasks, (Ericsson., Krampe, & Clemens, 1993; Winston, 2001) means a novice's cognitive resources may be largely devoted to developing initial category structures, whereas in an area where they are knowledgeable they can devote their full cognitive resources to idea generation and evaluation processes. Therefore, a person may have strong divergent thinking creative abilities, but they are not activated due to their cognitive resources being used for other cognitive processes in new situations. Secondly, a person may have strong idea generation skills, but weak knowledge of an area might mean that their ability to evaluate those ideas for appropriateness is low and hence they score low on fluency and elaboration measures.

This minimal knowledge contention would support the argument for the limitation of these types of tests. While creative thinking abilities may not be domain specific this does not mean that they can be picked up by divergent thinking tests that are not able to determine the processing functions that respondents are applying during the test. In relation to the Torrance tests however, the fact that most questions do not appear to be related to strong domain related areas of expertise means this problem should be minimal. A larger area of contention is that alluded to in the quote above by Plucker (1998) - that success on creativity tests may be more a reflection of the choice of thinking style, or cognitive strategy, than any inherent abilities.

3.3.2.1 Choice of Cognitive Strategy and Creativity

Instead of reflecting a respondent's inherent ability to think appropriately and originally, creative thinking tests may in fact be a better reflection of a respondent's choice of creative thinking processing strategy employed in completing the test itself. Further support for this contention is provided through the work of researchers looking at how instructions influence the creative thinking process. As noted by Runco and Sakamoto (1999), in their review of experimental studies on creativity - "Explicit instructions are often used as manipulations and can provide an individual with knowledge and strategies and thereby facilitate original and flexible ideation and insight" (Runco and Sakamoto, 1999, p.79). Indeed, Harrington (1975) found that instructions had a significant effect on the originality scores of respondents in divergent thinking tests.

Therefore, the difference between big C and little c processes being used by respondents under test conditions, may be due to the fact that in some test conditions dissimilar domain memories may be triggered by the question that is asked (Harrington 1975) – i.e. 'develop a creative solution?' Under such test conditions the basic cognitive technique of combining random domains would be used by respondents. This random cross-domain linking could also occur under non-test conditions due to environmental influences such as: chance encounters, social inputs, or deliberate use of creative thinking techniques. If instructions can lead to different strategies being used by respondents to undertake a creative task it follows that a respondent must have a range of cognitive strategy choices available for selection.

3.2.2.2 Choice of Cognitive Strategy and Creative Outcomes

Subsequently, in regards to the four constructs measured by the Torrance test, how respondents score could be more a reflection of the cognitive strategy chosen rather than inherent abilities. This might be what is reflected in the findings of Antastasi (1986) who reviewed the literature regarding the Torrance Test of Creative Thinking and found that respondents do not show high levels of cross-test correlation between scores on the same construct. This finding could be due to the imposition of time limits for completing the test tasks which might require respondents to choose a

particular cognitive strategy. This strategy choice that would result in an emphasis on one or other of the four different types of cognitive response: habitual, small c, bizarre and big C. Subsequently, the test results would reflect the cognitive strategy chosen more than inherent creative thinking abilities.

Cognitive Strategy Choice and Creative Thinking Techniques

This contention was given support by the research by Clapham (1997), which found that ideation skills are the primary elements measured in tests of creativity, and research shows that creative thinking skills can be enhanced through training. This research into the effectiveness of creativity training (Stokes, 1999; Scott, Leritz, & Mumford, 2004; Clapman, 1997; Lemon, 2005; Nickerson 1999). supports the contention that there are processing commonalities required for creative thinking and that these might be internally selected cognitive processing strategies. In a quantitative review of the effectiveness of creativity training, Scott, Leritz, & Mumford (2004) concluded that such training was effective across a range of settings and target populations and the effectiveness of the training appeared attributable to the training providing strategies for respondents to apply when generating creative ideas. Indeed, Ward, Patterson and Sifonis (2004) have shown that the way people approach a creative idea generation can be varied. It seems plausible therefore to posit that creative thinking may be dependent upon the cognitive processing strategy selected by the individual, and that these strategies can be enhanced through the use of training.

Therefore a method to increase creativity would be the use of creative thinking techniques that facilitate the dissimilar domain combinations process deliberately. One such technique that encourages the combination of divergent domains is synetics, Gordon (1961). Synetics encourages divergent thinking by forcing respondents to make distant category connections. It is also evident that other creative thinking techniques have a similar influence on creative outcomes. Creative techniques, such as word associations or the use of metaphors Wells, Burnett & Moriarty (2003), might well force a respondent to think across categories. The alternative to these divergent cross domain cognitive strategies, encouraged by these techniques, is the normal cognitive process whereby a respondent moves down their existing memory pathway to find a solution. Hence there are two cognitive strategy options: strategy one – cross

memory connections, and strategy two within domain memory searches. For strategy one the response would be more original, but appropriateness scores would be lower, and the reverse is the case for the second strategy.

Two Types of Cognitive Processes Strategy: Cross Memory Connections Versus Domain Memory Searches

It is posited that it is relatively easy to switch between the two different types of creative thinking processes during a creative thinking task, as long as the respondent knows how. If, for example, the task was to generate a list of round objects, then strategy one would involve domain thinking processes that merely involved searching their existing memory categories, starting with a common reference point, such as 'round' and presenting all related thoughts in that category that come to mind, for example, round ball, tennis ball, squash ball. For strategy two, where cross category memory combinations need to occur, a respondent can bring in random unusual categories to link with the task question, for example, round could be combined with the idea 'house' results in doorknob, round window. Doctor and round results in swivel chair base, pills, making the rounds, etc. This would result in the combination of dissimilar domains.

If it is the case that we have two choices in cognitive strategy selection then tests such as the Torrance test may be more a reflection of the respondent choice of cognitive strategy rather than pure inherent ability. Indeed, creative thinking processing strategies may well be skills that are able to be significantly enhanced through instruction. An increasing body of research is indicating that creative thinking techniques can be taught to respondents and result in increases in creative outcomes. Work by Stokes (1999), posits that a key component of creativity, variability, can be taught and that variability in an individual may differ between domains based upon initial reinforcement of variability.

Cognitive process selection relates to the proposition that a respondent may be able to apply different processing strategies to a task – either cross category thinking processes or within domain information searches. Moreover the strategy that we apply may cause us to access more remote associations given instructions, or deliberate

processing. Indeed, research by Tourangeau and Sternberg (1982) indicates that when people develop ideas based upon metaphors or analogies brought up in a category search; for example a car might represent freedom or pollution, they developed more novel ideas.

3.3.2.3 Time Limits and Creative Thinking Tests

A final issue in relation to the Torrance test, and other related tests, is the strict time limits placed on respondents in the test. As the four stages model proposes that creativity requires both an idea generation stage and a stage of internal idea evaluation and refinement, both convergent and divergent thinking abilities are required for successful creativity. Given that idea generation skills can be enhanced through creative thinking techniques that encourage cross domain combinations, idea refinement may be a more critical skill for creative success (unless, as is likely, it can also be taught in which case they may be equally important). It is not enough to generate highly divergent cross domain combinations, those ideas will need to be refined to a stage where they will be acceptable to peers in either or both of the domains of combination. This refinement process may take considerable time and be a reflection of many of the traits attributed to creative individuals: perseverance, intrinsic motivation, an internal locus of control (Barron and Harrington 1981; Dollinger, 2003). Given the time limit imposed by the Torrance test it would be difficult for respondents to score highly on both convergent and divergent abilities unless they were skilled in the use of cognitive processing strategies which facilitate both types of cognitive creative thinking process, or have high levels of knowledge of both creative thinking techniques and knowledge of the domains being combined.

In regards to the model and the four types of creative thinking processes, the Torrance test captures different types of processing strategy and therefore cognitive responses. Despite there being four potential cognitive responses the two sets of responses; a) habitual and small c, and b) bizarre and big C responses, could be the result of the same retrieval processes. Subsequently, the four responses might reflect only two cognitive processing strategies. The first of these two strategies involves the retrieval and possible integration of existing memories, and results in habitual, or little c responses. The respondent is following existing well-established memory nodes to

find a response. The cognitive process involves the retrieval of similar category memories and results in either habitual or small c creative responses. The respondent retrieves and/or combines memories that are closely related and well established. The cognitive process involved in the second strategy involves the retrieval of divergent category memories and would result in bizarre, or big C creative responses.

3.3.3 Expert Judgement Measures

People evaluate ideas based upon their current domain knowledge. Therefore, new ideas that combine information from the current domain with a very dissimilar domain are likely to be perceived as bizarre and inappropriate, unless the appropriateness of those ideas to the domain is explained. It is unlikely that most people who come up with inventive ideas are able to achieve acceptance of that new concept without significant effort and strong communication skills. This contention is in line with the common finding that perseverance and a low need for social acceptance are key personality characteristics of creative people (Barron and Harrington, 1981; Dollinger, 2003). Using expert judges to evaluate the final outcome of creative ideas without also evaluating the reasoning behind the solution (reasoned solutions) may mean that potentially big C creative ideas are evaluated merely as bizarre - and subsequently discounted.

In addition to all of these general measurement issues, for each of the 3 main creative measurement approaches, there are also a range of issues in relation to the different types of ideas generated by respondents. Each of the three measures will encounter different issues in relation to the four types of idea combinations respondents may produce; within domain combinations – habitual or small c ideas; cross domain combinations – bizarre or big c ideas (refer figure 3.4 pg 64).

3.4 Combination of Ideas from within the Domain - Measurement Issues

These ideas are made up of two types: 1) existing solutions that are known to the domain, although they may have been known to the idea generator previous or, 2) solutions which involve a new connection of ideas from within the domain. This new connection will be a new connection for the domain although it will not be seen as highly original as it will be related to existing domain knowledge. The first type of idea is a habitual response, the second a small c creative idea.

3.4.1 Habitual, Uncreative Ideas

Habitual ideas are ideas that do not involve any new combination of ideas either within or across domains. They are likely to be common responses to a problem or situation that is widely known. Theoretically a person may possess a habitual response that is new to society and so may appear under test conditions to be a small c solution. However, the vast majority of habitual responses will be common responses that are known to society.

In many everyday situations a person's memory categories are so well established it makes creative thinking difficult. The better developed and often-used the memory pathway, the easier the response and the less cognitive effort required (Winston, 2001). Many cognitive responses to situations will be almost automatic for example, running from danger. Very high levels of domain knowledge or experience could result in a reduction in creative responses, because automatic responses are triggered that are satisfactory (Barsalou, 1983). A person might have to be made aware that new responses are required before creative thinking processes are enabled – problem definition/stage one. Ideas that are a result of habitual thought processes (retrieving ideas from within an existing domain, either internally or from a secondary source) are not creative. They might be highly appropriate, intelligent responses, but they are not original.

3.4.1.1 The Historic, Eminent People Approach

Habitual ideas will not be evaluated as eminent ideas, as they do not involve linking of distant categories and hence are not highly original. They will not act as a basis of analysis in this approach.

3.4.1.2 Creativity Tests

Given limited domain-specific knowledge effects due to the general nature of the Torrance Test tasks, an emphasis on strategy one and habitual responses should result in: strong elaboration scores because responses are from a common and well-defined memory category; a strong fluency score because habitual responses are easily retrieved and appropriate to the domain; a low originality score because responses will not be uncommon; and a low flexibility score because habitual thought processes should result in a high number of responses that are from the same category.

However, a habitual response is a response that has been repeated many times by the respondent and is therefore highly unlikely to be perceived by others as a new response unless the idea is new to the judge. The Torrance test controls for this type of problem by providing a wide range of question that are not domain specific and hence should not be a reflection of individual expert knowledge.

3.4.1.3 Expert Evaluation Approach

Most habitual ideas will not be viewed as creative because judges would already know of these responses. However, a respondent who possesses very high levels of knowledge in a domain may have their ideas judged as creative because judges might not have thought of this solution themselves. However, as long as these ideas are not original at a societal level, they are not creative ideas. Alternatively, that idea might no longer be original to the individual, (for them it may be an old idea) but is still new at a society level. Therefore, the idea would be creative, but the cognitive process used in that instance by the individual would no longer be creative thinking processes, merely retrieval processes. Subsequent, as noted by Amabile (1996), the selection of judges is critical.

At an individual level a respondent may put two concepts together within their mind and for that person the idea is creative, whereas experts who already possess that knowledge would not evaluate the idea as creative. For the expert it is a well-developed habitual response. Many of our ideas will be new at an individual level, but not new to the domain. Expert judges will therefore evaluate these ideas as not creative, as they are not new to the domain, even though they are new at an individual level. From a processing perspective, the individual would be undertaking creative thinking processes although the resulting idea is not creative at a societal level.

3.4.2 Small c Creative Ideas

Small c ideas are ideas that combine information from within a domain in a new way. Small c responses at their most basic level extend habitual responses by adjusting them to situational variables. Alternatively, small c connections may be made by re-evaluating for domain knowledge internally and identifying new ways to link the existing domain knowledge. The small c idea is an extension of the habitual thought process that leads to new connections being made between similar domains of memory. Most small c responses will require the evaluation and re-evaluation of domain knowledge so that potential gaps between concepts can be identified and re-combinations of information achieved. Under test conditions this would involve respondents re-evaluating their existing domain knowledge, or the task-specific information that is available to them, to find connections.

Ideas that are a result of combining thoughts from within a domain in a new way will result in small c creative ideas. These ideas will tend to be appropriate because they relate to the domain, and they will be original to a varying degree (from low to moderate) based upon the extent to which others in the domain have pursued that line of thinking. However, the ideas are not likely to be evaluated as highly original because people within the domain will be able to logically, and relatively easily, make the same connections once they are presented. Experts will use their own domain knowledge to quickly understand the response and they will not view it as highly original.

Most academic findings, except for seminal work, are small c creative ideas. Small c creativity will require extensive knowledge of the domain in order that ideas are not repeated, and this extensive knowledge will result in the identification of gaps between ideas within the domain. However, this extensive knowledge may limit the chances of cross-domain thoughts due to: narrow problem definition, automatic responses, and strict internal and external evaluation criteria being applied to new ideas (refer Chapters 4 & 5).

3.4.2.1 The Historic, Eminent People Approach

Small c ideas will not be evaluated as eminent ideas and therefore, will not act as a basis of analysis in this approach.

3.4.2.2 Creativity Tests

As with habitual responses the cognitive strategy that emphasises small c responses would result in low flexibility scores because the respondent is focusing on one particular area of domain knowledge to find a response. The originality score would depend upon the degree of sensitivity of the measurement technique. As long as measures are able to identify and classify responses as different from other similar, yet slightly different, existing domain-based responses, small c responses should score moderately in terms of originality. However, because these ideas might reflect elements of other existing domain solutions they could be classified erroneously and rated poorly in regards to originality. The responses should rate highly in terms of elaboration measures as the responses are a reflection of high domain knowledge and therefore, they should be able to elaborate on those ideas. Additionally, the ideas will appear fluent, or appropriate, because they can be easily related to the domain.

3.4.2.3 Expert Evaluation Approach

Small c ideas will be viewed by experts as being from low to moderately original, depending upon the extent to which those experts have researched similar conceptual ideas. However, small c ideas would rate highly in regards to appropriateness measures. Experts in a domain will be able to easily comprehend and acknowledge

ideas that are the result of new combinations of concepts from within a domain. Those ideas will be judged as highly appropriate, but not highly original, and therefore seen as less creative than cross-domain combinations, although they may be highly significant – small c creativity. Indeed, these small c contributions are essential for testing and ensuring big C ideas are correct and can be applied. Few people would view the constant development in computer chip technology as being more creative than the development of the computer itself, but this research is extremely complex and has been central to the computer’s proliferation. Big C ideas are of little value if they cannot be applied, and this requires small c ideas.

3.5 Combination of Ideas from Different Domains - Measurement Issues

These ideas redefine the parameters of an existing domain by combining information from one domain with another dissimilar domain and will be viewed as either; a) bizarre - highly original but inappropriate, or b) eminent big C ideas - both highly original and appropriate. Whether they are seen as bizarre or eminent ideas will depend upon how well they integrate with the accepted wisdom of the field and are therefore, accepted. The extent to which the idea inventor is able to express ideas and gain acceptance in the field will also be essential.

3.5.1 Bizarre Ideas

Ideas that are the result of cross-domain combinations but are not recognized as appropriate to the context of either domain, would be categorized as bizarre ideas. For example, if the answer to the question – ‘What is a round object?’ was ‘a brick’, this answer would be viewed as inappropriate.

3.5.1.1 The Historic, Eminent People Approach

Bizarre ideas will not generally achieve wide recognition and therefore will not act as a basis of analysis in this approach. An idea will be bizarre to people within a domain if it can not be related to that domain. Given an idea is merely highly original, but not appropriate to a particular domain, people within the domain will not be able to understand the idea’s relevance. For an idea to become an eminent idea it must relate

to a domain or field, as it is domain knowledge that is used as the basis for understanding and accepting new ideas.

3.5.1.2 Creativity Tests

Bizarre responses will score highly in terms of flexibility and originality measures, because they will be unusual combinations. They will result in poor elaboration and fluency measures because they involve the combination of highly dissimilar domains and therefore it will be difficult for the respondent to elaborate extensively on the combination, especially given the limited time provided under test conditions. The domain knowledge-based fluency criteria will also mean that these combinations are unlikely to be evaluated as fluent.

3.5.1.3 Expert Evaluation Approach

Bizarre ideas will be viewed by experts as being highly original, but will rate poorly in regards to appropriateness measures - given the strong domain-specific knowledge-based evaluation criteria. As we evaluate ideas based upon our current domain specific knowledge, experts in a domain will be able to evaluate bizarre ideas as inappropriate, whereas a novice may have difficulty determining the appropriateness, or otherwise, of an idea.

3.5.2 Big C Eminent Creative Ideas

Ideas that combine ideas from one domain with ideas from another domain in an appropriate way are eminent big C creative ideas. These ideas will change the parameters of the existing domain. Such ideas will be viewed as highly original, although it may be difficult to obtain acceptance of these ideas and many of them may initially be evaluated as bizarre rather than eminent ideas, for example, Darwin's Theory of Evolution (Simonton, 1999).

The combination of ideas from very different domains is likely to be viewed as highly original, although it could be difficult to convince people that the resultant idea is also appropriate. Therefore, it is very rare to achieve acceptance of an idea as both highly original and highly appropriate. People will evaluate any ideas based upon their current knowledge of a domain; therefore, new ideas that combine information from

the current domain with that from a very unusual domain are likely to be perceived as bizarre and inappropriate. Indeed, Simonton (1999) noted that most creative breakthroughs can not be ‘too new’ otherwise they are not accepted within the domain. Big C ideas will need small c support in order to gain acceptance in the field; they will need refinement.

It is unlikely that a person will be able to achieve acceptance for a big C concept without significant effort and strong communication skills. It is also unlikely that person will be listened to unless they are already recognized and respected in a particular field. This causes the additional problem in that high levels of expertise will be required in a field to increase the likelihood of idea acceptance, but without the use of creative thinking techniques the domain-specific knowledge of that person is likely to reduce their ability to combine divergent domains (refer Chapters 4 and 5).

3.5.2.1 The Historic, Eminent People Approach

Recognized, established big C ideas will be evaluated as eminent ideas and are the basis of analysis in this approach. Big C ideas that are in their initial stages of being expressed and gaining acceptance are not likely to be used as the basis of analysis in the consensual approach, although they may be future bases of analysis.

3.5.2.2 Creativity Tests

Given bizarre and big C idea generation processes are the same, big C responses would score strongly in terms of flexibility and originality measures but only moderately on elaboration and fluency measures. Despite the fact that they in future may be shown to be appropriate ideas, under test conditions a respondent might not have had time to develop strong connections or arguments between the new idea and the domains and therefore, provide the basis for elaboration and fluency. In some cases the connection will be seen by judges as it will be appropriate to the domains, but in other cases if the judge’s knowledge of either of the domains is limited, they will not see the appropriateness of the connection. Runco (2004),

“Time is indeed an important resource. Mednick (1962), for example, suggested that original ideas are remote and well removed from the original problem or initial idea. This remoteness requires time; it takes

time to move from idea to idea to idea, and to find (eventually) the ‘remote associate’ (Runco, 2004, p.662).

The refinement process is therefore a critical part of the creativity process (refer chapter 5).

3.5.2.3 Expert Evaluation Approach

Big C responses will be viewed by experts as being highly original, but without further elaboration of the basis for those ideas they may not rate highly in regards to appropriateness measures. As in the creativity tests, the expert’s lack of knowledge of the alternative domain might result in the use of inappropriate evaluation criteria.

3.6 Measurement Issue Summary

What is critical to note is that the testing method, instructions, time limits and external evaluation might all influence the cognitive strategy selected by respondents. This in turn is posited to influence the creative outcome of responses. Subsequently, creativity tests may be a reflection of different cognitive processing strategies, (and experience in these strategies) selected by participants more than individual creative abilities. Tests of creative thinking ability attempt to test constructs that are meant to represent key abilities required in the creative individual. However, test results might be a result of processing strategy rather than purely inherent abilities. Expert evaluations are a method of judging creativity in individuals given tasks under test conditions, but they are limited also by subjectivity constraints, caused by the domain specific knowledge of the judges.

Second, the historic eminent person approach takes highly creative ideas that have already been accepted and uses them as the basis for identifying individuals who can then be the unit of analysis. Personality and individual characteristics, as well as environmental conditions, can then be analysed for their influence on creativity. This method focuses on eminent or big C creativity and does not capture small c creativity or look directly into the creative thinking processes.

Of the three methods, the expert judge approach probably best reflects the realities and complexities that face most individuals who have a creative idea and are attempting to gain recognition. The subjective nature of creativity evaluation is well acknowledged in the creativity literature and domain knowledge at any point in time is the basis for this subjective evaluation:

“...secondly creativity is a subjective judgment made by members of the field about the novelty and value of a product: it is not an inherent quality that can be measured independent of social-construction processes within a field. Third, creativity assessments are domain-specific, and they may change over time as a domain evolves by retaining creative actions.”
(Ford, 1996, p.1115)

Although creativity may be a subjective construct that we cannot evaluate independently of the domain, we might be able to objectively measure a person’s creative thinking processes irrespective of the domain. The difficulty is that current tests do not appear to be able to provide consistent evaluations of individual creative thinking abilities or strong external validity. It is contended that this may be due in part to the measurement constructs also being a measure of cognitive processing strategy choice, rather than of inherent creative thinking abilities alone. In order to capture inherent ability differences, if they exist, these differences must be identified separately within the different types of creative process. From this, tests can be developed that measure individual abilities in the different creative thinking processes.

3.6.1 Differences in Creative Thinking Processes for big C and small c ideas

It has long been recognized that there are difference between types of creative thinking processes. Kirton (1976) discussed the concept of adaptability (the ability to do things better) and innovation (the ability to do things differently). It may be that the requirements for big C versus little c creativity are in many respects contradictory to one another:

“The concept of incremental innovation is clearly different from the notion of radical change or a shift in paradigms. In fact, incremental

innovation may actually serve to retard the development of decidedly new ideas, solutions, or products by focusing on minimizing variation in processes, products and services. This may be one reasons why Nystrom (1990) found that the most innovative division in his study also had a low orientation toward quality” (Tesluk, Farr & Klein, 1997, p.38).

Scott and Bruce (1994) also noted that systematic problem solving had a negative impact on innovative behaviour. However, despite the significant difference between incremental creativity and transformational creativity, most studies of creativity do not make any distinction between them in their measurement, and there has been little research into any differences. It is the contention of this chapter that the best way to illustrate the difference between types of creative outcomes is to look at how domain knowledge is combined. Within-domain combination processes will result in small c creative ideas, and dissimilar-domain combinations will result in bizarre or big C creative ideas. The first process requires convergent thinking and domain-specific knowledge, the second divergent thinking and knowledge of a range of different domains. Big C creative processes will change the parameters of the domain while small c ideas will expand the current domain.

This contention relates well too many of the conceptual insights regarding eminent creativity that have been observed over the last 50 years. In particular two aspects: a) divergent thinking - as the cornerstone of creativity research, and b) eminent creativity as a rare and unusual occurrence - that changes the parameters of the domain. This rarity of big C ideas can be explained by this recombination and domain-based view of creativity.

3.7 Chapter Conclusions

Returning to the debate that was introduced at the beginning of chapter two: Is creativity a common occurrence that everyone in society is capable of, or is it a rare and extraordinary event that rarely occurs in any given age?, (Csikszentmihalyi & Epstein, 1999). The answer may lie in the different types of creativity – big C versus small c, as well as the different basis for creative thinking analysis – individual vs societal. Individually we are all capable of original ideas, as we make new

combinations based upon our own domain-specific knowledge. However, most of these ideas will not be new at a societal level. Therefore, we are all capable, to differing extents, of creative thinking processes, but very few of us will have societal level creative ideas. Fewer still will have the resources or expression skills to attain support and recognition for those ideas and achieve creativity.

In relation to big C and small c creativity, these two processes may require very different cognitive strategies. Small c creativity will require an extensive process of evaluation and re-evaluation of the existing information within a domain. From this analysis re-combinations and reorganization of information could lead to different combinations of existing domain knowledge. A focus on past information as the basis for idea development suits situations that require solutions that will be accepted, and where immediate implementation is a priority. This is the situation faced by many organizational personnel and academic researchers, "... relevant factual information may represent a fundamental requirement for creative problem solving in organizations" (Mumford, Whetzel, Reiter-Palmon, 1997, p.10).

Generating big C creative ideas may well require a completely different focus than that of small c idea generation. This may have led to the often-held view that creativity is something of a mystical phenomenon "The study of creativity has always been tinged – some might say tainted – with associations of mystical beliefs (Sternberg & Lubart, 1996, p.679). The reason for this may be the seemingly unfathomable divergent combinations that are made in big C idea generation. Indeed, how these leaps of logic are made has been an area of significant speculation in the creativity literature, with a variety of potential explanations. Kris (1952) proposed that unmodulated thoughts in consciousness may stimulate creative thinking.

"Unmodulated thoughts can occur during active problem solving but often occur during sleep, intoxication, from drugs, fantasies or daydreams, or psychosis" (as cited in Sternberg & Lubart, 1996, p.680). Simonton (2003) in his study of eminent creative individuals has found that notable scientists read widely in areas outside their discipline and that "Serendipitous events often are responsible for unanticipated breakthroughs" (Simonton, 2003 p.479).

Other researchers have also noted that: “The accidental nature of many discoveries and inventions is well recognized. This is partly due to the inequality of stimulus or opportunity, which is largely a function of the environment rather than of individuals” (Guilford, 1968, p.79). Still other researchers have identified the fact that researchers who move from field to field tend to be viewed as more creative than those that focus on one field throughout their careers (Kasof, 1995). This research points to the conclusion that logical thought processes and knowledge of a field alone may not result in big C creative ideas, and that some sort of creative leap is needed.

This creative leap, or the Gestalt ‘Aha’ moment or ‘insight’, is posited to be central to the big C creative process, and it is this moment that is the instant when a combination of highly divergent domains is achieved.

“The phenomenon of insight, which has been brushed aside generally by stimulus-response psychologists, because they have not known what to do with it, deserves considerably more attention than it has been given. It can no longer be disposed of with the cliché, ‘It’s all a matter of past experience’ Of course it is largely a matter of past experience; what behaviour is not? But there is always something new about an insight, and it is the business of psychologists to find out what that ‘something new’ is and how it comes about” (Guilford, 1968, p.126).

This insight could well be the new environmental information that came from a domain outside the previous anchor points or search parameters, which is then applied to the problem or situation (Schilling 2005)..

The Gestalt moment might occur in that instance where we take new information, either through use of creative techniques or through encountering different stimuli, and apply it to an existing problem. It could be past experience revisited in a new way in application to the problem or it may be situation factors, such as relating entirely different information to the problem. It might occur during the idea generation stage or it could be about redefining the problem to set new or different anchor points or search parameters that then allow new information to be used, as is the case with many creative thinking techniques. A key issue will be the extent to which a person’s domain knowledge hampers or enhances the different types of creative thinking strategy.

3.7.1 Domain-Specific Knowledge and Creative Thinking

A novice's lack of knowledge of a domain could mean that they are more likely to call upon alternative domains to assist in generating a solution to situations, because they do not have existing satisfactory solutions internally. A novice's lack of knowledge could lead them to generate a certain number of potentially highly original ideas at a societal level. A small number of those ideas could also prove to be appropriate to that domain and end up becoming eminent big C creative contributions. A significant issue will be the extent to which expert judges will view these ideas as appropriate, especially given potentially limited expressive abilities of the novice given their lack of domain expertise.

An expert's strong domain knowledge could mean they automatically undertake habitual processing when faced with a situation and therefore do not apply cognitive processes that would allow for original solutions. Essentially, experts may have established neural networks that are so well established they use them automatically and therefore do not look for better solutions. For experts, the key creativity issue may be how they get themselves to think outside their domain to find new ideas for combination.

The extent of a person's domain-specific knowledge provides a hypothetical explanation for the Lehman finding that young people are more likely to come up with major creative contributions. The young person's lack of domain-specific knowledge might mean they are more likely to combine memories from dissimilar domains which then change the parameters of the existing domain. It also provides an explanation as to why major contributions recede in middle age, as a person's strong domain-specific knowledge may mean they are more likely to use information from within the domain to find solutions rather than looking outside the domain. The contention is that domain-specific knowledge might limit big C ideas while assisting small c ideas. There are a number of potential explanations for this contention. Domain-specific knowledge influences the type of creative solution generated due to its impact on various stages in the creative thinking process: a) problem definition, b) idea generation, c) internal evaluation and refinement, and, d) idea expression. These impacts are the focus of the next two chapters.

4.0 Domain-Specific Knowledge Effects and Creative Thinking

An interesting anomaly exists in the creativity literature. Many researchers assert that domain knowledge is central, and an antecedent, to creative thinking (Briskman, 1980; Simon, 1986; Amabile, 1983; 1988; Frensch & Sternberg, 1989; Simonton, 2003). However, other cognitive science researchers have found that a person's knowledge can limit their ability to generate creative ideas (Adelson, 1984; Ward, 1994; Wiley, 1998). These two, apparently conflicting, viewpoints relating to how existing domain knowledge affects creative thinking processes are discussed in this, and the next, chapter.

In a review of this debate on creativity and knowledge, Weisberg (1999) discusses the issues in relation to two views, the foundation view - that domain specific knowledge provides the basis for creativity to occur, and the tension view - that there is a U shaped effect whereby knowledge provides the building blocks for creativity, but over a certain level that knowledge can lead to habitual behaviour and limit creativity.

The knowledge view is based upon the finding that it takes many years of immersion in a field before creativity is forthcoming (Csikszentmihalyi, 1988; Simonton, 2003). The tension view is based upon the findings of cognitive psychologists (Hecht and Proffitt, 1994; Ward, 1994; Marsh, Landau and Hicks, 1996; Wiley, 1998; Ward, Patterson, Sifonis, Dodds & Saunders, 2002) and practitioners (De Bono, 1968), whose experimentation and practice has shown how expertise can limit creativity, and the finding that formal education seems to have a U shaped impact on a person's lifetime creative productivity (Simonton, 1984).

The following statement highlights the difficulties in understanding the effect of domain specific knowledge on the creative process.

“With regard to knowledge, on the one hand, one needs to know enough about a field to move it forward. One cannot move beyond where a field is if one does not know where the field is. On the other hand, knowledge about a field can result in a closed and entrenched perspective, leading to a person not moving beyond the way

in which he or she has seen problems in the past (Frensch & Sternberg 1989)” (as cited in Sternberg & Lubart, 1996, p.684)

How much knowledge is too much knowledge? How can we overcome the need for extensive knowledge in an area to act as the basis for idea generation, while avoiding the problem of becoming entrenched in an outdated perspective?

Existing research provides conflicting findings in relation to these questions. The issue may be best put by the statement in an article by Marsh, Landau and Hicks (1996) that found that while providing examples to experimental respondents can lead to a conformity effect, it did not necessarily constrain creative output.

“A delicate balance clearly exists between (1) the facilitory effects of providing examples, analogies, and reminders (see e.g., Gick & Holyoak, 1980; Ross, Ryan & Tenpenny, 1989) and (2) the cognitive fixation (see e.g., Smith & Blankenship, 1991) or constraining effects on creativity that are the focus of present concern” (Marsh, Landau and Hicks, 1996, p.670)

So, on the one hand researchers have concluded that domain specific knowledge is an antecedent to creativity. “A person’s prior knowledge of a domain is critical to creative performance (Amabile, 1983b) and it has been noted as a prerequisite to creative action in a domain (Simon, 1986; Amabile, 1988)” (Ford, 1996, p.1124). This view is given support by the work of Simonton (2003) and others who, through extensive historiometric analysis of eminent creative individuals, have concluded, that “It has been estimated that it usually requires at least a decade of extensive study and practice to attain world-class expertise in any domain of achievement, (Haynes, 1989; Ericsson, 1996), and there is no reason to doubt that scientific creativity is any different” (Simonton, 2003, p.484). However, what is not known from this research is what happens in the ten years prior to an individual developing their first eminent breakthrough (Weisberg, 1999), and what causes this creative void period.

On the other hand, it is acknowledged that domain specific knowledge can lead to functional fixedness. This concept of functional fixedness has been part of the knowledge/creativity debate for some considerable time. Guildford (1968) uses the term functional fixedness to define knowledge that maintains its definition or

interpretation tenaciously and hence is unable to be used in other forms. However, in Guildford's view (1968), it is not the case of knowledge necessarily limiting creativity, but how that knowledge is stored. While Guildford acknowledged studies that showed a poor relationship between IQ and creativity, his conclusion was not that good memory and creative thinking are incompatible. This is because he considered IQ tests do not test the type of cognitive abilities needed for creativity. Rather than seeing good memory and creative thinking as incompatible he notes that it is the way that information is stored that is critical.

Information Storage/Memory Structures and Creativity

How information is stored has been incorporated into modern network models of creative thinking (Schilling, 2005). The more associations are reinforced over time the more efficient the retrieval process of expert individuals. This efficient retrieval process may lead to functional fixedness where an individual automatically recalls a representation and has difficulty in doing otherwise (Schilling, 2005). Therefore, expert knowledge, and the need for highly efficient storage of large amounts of knowledge may cause good memory and result in poor creativity. Indeed, it is this cognitive fixation (Ford 1996; Marsh, Landau and Hicks, 1996) that leads strong knowledge in a domain to result in habitual, automatic responses. This cognitive fixation has attracted increased research over the past decade.

A study by Wiley (1998) reviewed a number of groups of studies of various tasks where experts were outperformed by novices. From one of the groups of studies he found "...that experts can be outperformed by novices when a new task or context runs counter to highly proceduralized behaviour" (Wiley, 1998, p. 716). One of the studies reviewed in this group was that of Hecht and Proffitt (1994) that showed that waitresses and bar staff continued to use representations that were suited to their normal way of performing a task rather than shifting to more appropriate methods. The Wiley article went on to find that under experimental conditions an expert's well established knowledge structures can inhibit the development of creative ideas due to mental set fixation.

Mental Set Fixation

Mental set fixation is where strong domain knowledge constrains search behaviour by confining the search to a limited area of search space. One related theoretical construct, 'structured imagination', proposes that when faced with a situation that requires a creative solution, a person might take a path of least resistance by retrieving domain-specific information, or an internal solution, and then attempt to adapt that old construct in some novel way (Ward, 1994). So there appears to be a contradiction in the literature in regards to how domain specific knowledge influences creativity. On the one hand researchers state that knowledge is an antecedent to creativity and on the other that knowledge can limit creative thinking due to an expert's highly structured memory categories.

4.1 Research Differences in the Debate

One of the big differences between these seemingly contradictory views stems from the types of ideas under analysis by the various researchers. Work by Briskman (1980), Lehman (1953) and Simonton (2003) concentrate on eminent individuals whose ideas are universally accepted. Their analysis focuses on individuals' after their ideas have achieved acceptance, and so looks at creativity from the perspective of what can be determined about creativity post idea success, rather than looking at actual creative thinking cognitive processes. The ideas under analysis fit this thesis' definition of big C, or eminent creative ideas. However, the point at which idea germination took place, or even who generated the original idea is not known. It is possible that most creative ideas are generated long before they are expressed and/or accepted and are part of a highly socialized idea generation process.

While a creative individual usually has to possess extensive knowledge to achieve idea acceptance, this extensive domain knowledge might not be what was required to generate those same ideas. Findings from analysis of creativity across fields have pointed toward the need for the development of skills and knowledge as the reason why it takes 10 years to work at world class level (Weisberg, 1999). Performing at

world class level does not mean those same ideas were not generated prior to a person having the skills to make those performances. There is undoubtedly a difference between creative idea generation and the societal achievement of creativity, and domain specific knowledge may have different effects on the various stages of the creativity process. This is supported by the often repeated note in the creativity literature that many significant breakthroughs to a domain have come from outside that domain (Kim, 1990; De Bono 1968).

Many researchers have the view that one can not be creative unless one has a knowledge of what has already been learnt (Nickerson, 1999). However, this is countered by the fact that there are examples of creative breakthroughs occurring outside the domain.

“For years physiologists could not understand the purpose of the long loops in the kidney tubules: it was assumed that the loops had no special function and were a relic of the way the kidney had evolved. Then one day an engineer looked at the loops and at once recognized that they could be part of a counter-current multiplier, a well-known engineering device for increasing the concentration of liquids” (DeBono, 1968, p.148-149).

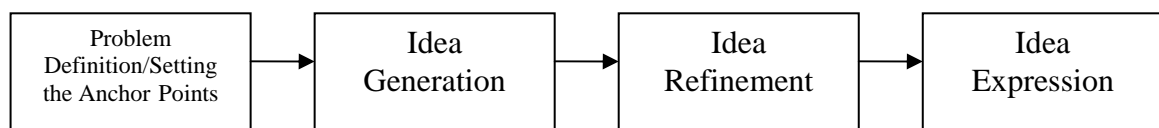
While these exceptions may be relatively rare it is important to consider what these exceptions tell us. Primarily that a different perspective can provide more divergent cross memory category combinations to occur and overcome the fixation of an expert’s existing domain’s expertise. It is not fully known when many great creative ideas were first generated, or how many great creative ideas have been lost due to a novice’s lack of recognition in a field. An expert’s knowledge and reputation may provide the basis for expression and gaining acceptance of creative ideas; but does it assist in the problem definition and idea generation processes?

On the other side of the debate is research by cognitive researchers such as Ward (1994), Marsh et al. (1996), Ward, Patterson, Sifonis, Dodds & Saunders (2002), who do not look at creativity from the perspective of analyzing recognized creative genius, but research creativity in everyday people under experimental conditions. This focus on researching the creative idea generation process under experimental conditions means rare eminent ideas were not likely to be central to the analysis - or recognized by experiment coders even if they are forthcoming. The time restraints under

experimental conditions coupled with the fact that eminent creative ideas need to be refined over time to improve and demonstrate their appropriateness to others, probably means that eminent creative ideas can not be developed to a stage where they are recognized under experimental conditions. Additionally, this research only looks at the idea generation stage of the creativity process and does not analyze issues relating to problem definition, evaluation, or expression. Neither does it bring in the range of environmental nor social factors that may provide the basis for cross domain fertilization to occur. What these different research bases highlight is that within the field of creativity research different researchers are using different definitions of creativity and are studying different parts of the creative thinking process. This leads to the need for a) a broader definition of the different types of creative ideas, b) a stage based definition of the creative process, and c) a greater understanding of the effects of domain specific knowledge.

The extent of a person's knowledge may have different effects on a person's ability to generate eminent versus less eminent outcomes. If we are to split creative ideas into eminent big C creativity, and incremental small c creativity, then given how those terms are defined, (refer Chapter 3) we can make propositions as to the effect of domain-specific knowledge on each type of creative outcome. Indeed, DSK might have differing effects on each of the four stages of the creative process introduced in Chapter 2, depending upon the type of creative idea being generated - big C or little c. The focus of this chapter is to evaluate the effect of domain-specific knowledge on the first stage of the creative process: problem definition, and setting the anchor points.

Figure 4.1: The Four Stage Model of Creativity



4.2 Problem Definition - Encounter & Define the Situation

As evidenced in the research earlier, while extensive domain specific knowledge may result in fixation what may be more important than knowledge storage in the creative process is the process of knowledge retrieval. Given that creative thinking requires

domain combinations to occur, a base of knowledge is needed for those combinations and it is the ability to access and combine divergent domains that is critical for big C creativity. This leads to the importance of problem definition in the creative thinking process. Much research has focused on the problem definition phase of the creativity process. This is because it is beginning to become evident that creative thinking processes are the result of deliberate divergent thinking processes that encourage cross domain combinations to occur. Therefore, how we set the starting or anchor points through problem definition will influence the potential for creativity to occur.

Any situation has the potential to result in a person undertaking the creative process. How a person views a situation will determine whether the creative process occurs. If a situation is viewed as needing a new solution the creative process might result. “Creativity occurs when people solve novel, ill-defined problems” (Mumford, Whetzel & Reiter-Palmon, 1997, p.9) While creativity researchers have stated that creative thinking requires a novel problem, any situation can be viewed as either a novel problem or a routine situation, based upon: a) the person’s level of motivation, and b) the person’s level of domain specific knowledge.

4.2.1 Motivation and Creativity

There is always an existing solution to any problem even if it is suboptimal (Getzels & Csikszentmihalyi, 1975). If we need to move rocks from A to B we can put them on our backs or we could invent the wheel. We could look for solutions down well established memory pathways or we could think divergently across more distant memory categories for new solutions. One question is therefore, ‘why do we not all automatically think divergently more often? The high cognitive cost of creative thinking versus the low cognitive cost of using existing solutions may partially explain the difference (Ericsson, Krampe, & Clemens, 1993; Weisberg 1999; Nickerson, 1999).

The High Cognitive Cost of Original Thinking

Given that big C creativity is the result of a cognitive processing strategy that forces divergent cross memory linkages (Clapham, 1997), everyone has the potential to be

creative if they choose to apply this cognitive strategy. While there has been limited research into cognitive strategy choice in creative thinking, research by Kaizer and Shore (1995) showed that students choose different strategies from each other to solve math problems and that this choice influenced the quality of outcomes. What was not clear from this study is what lead to the different strategies being selected. The creative processing strategy of combining distant domains is a highly cognitively taxing process as it requires a large number of links between memory categories to be made and therefore is not a strategy that people would choose, (or even be able) to apply all of the time.

The combination of dissimilar domains of knowledge is more difficult and cognitively taxing than combining similar domain knowledge. The memory nodes will be further away from one another and will require additional effort to make those connections (Winston, 2001). This process may be required in the case of a novice in the problem domain, who has a lack of domain knowledge, meaning they have to use their knowledge of divergent domains and combine that knowledge with the situation-specific domain information to create new combinations. However, in situations where a large amount of knowledge must be integrated before a problem can be defined and idea generation occurs, a novice may use most of their cognitive resources in category development rather than idea generation.

This cost problem is explained through the network model of cognitive processing where it is contended that cognitive networks are characterized by dense connections between related nodes and distant connections between more distant nodes. Nodes are then structured and ordered resulting in relatively long path lengths in a network (Schilling, 2005). Subsequently, big C ideas will require more distant memory links and be more cognitively taxing than small c ideas. Individual motivation is probably therefore a significant factor in determining the likelihood of which of the four different thought processes occur; habitual, small c, bizarre or big C ideas.

Additionally, as the distance of path lengths is relative to the level of expertise of the person, what might be a relatively short path length for an expert might be a distant length for a novice. Therefore cognitive processing required for big C creative thinking requires spending significant resources to develop network connections

between distant categories, however, once a new memory combination has been made it becomes less taxing to use over time, as the expert is merely moving down those existing structures (Winston, 2001). In fact the process of developing extensive knowledge of a particular domain is the method by which people reduce cognitive processing requirements.

Motivation is therefore probably a key factor in determining creativity given the highly taxing nature of creative thought processing. People may not think as creatively if they do not allocate sufficient memory capacity to a problem. However, not only will the high cognitive cost of creative thinking limit creativity to situations where a person is highly motivated and has free cognitive resources to devote to it, the extensive memory pathways developed by the expert to reduce cognitive processing costs may lead to automated habitual responses and mental set fixation.

4.2.2 Domain Specific Knowledge and Problem Definition

One of the primary problems for an expert that limits creative thought is the fact that they might automatically interpret a situation and use well established responses without consciously searching for a better solution. In other words they are following strategy two instead of strategy one (refer chapter 3) – looking down existing domains for a solution rather than across domains. A problem with this approach is the situation that requires a new or better solution. Creative breakthroughs are the result of questioning the status quo and defining situations as needing a new solution. While in a number of work and educational settings people are told to treat a situation as a problem needing a new solution, in most situations each individual will have to define a situation as either a problem or not.

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

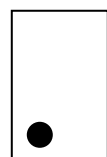
to the memories cued by the situational information, people will also apply decisions rules and procedures to assist in defining a problem. If a person's memory categories, and/or decision rules, are so well established that they trigger a habitual response to a situation then creativity is less likely to 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. However given that creative thinking requires combinations of ideas across domains it is more important to determine the effect of unfamiliar stimuli on idea generation, rather than familiar stimuli.

As noted by Marsh, Ward and Landau (1999), "Because at least some creativity may occur in largely unexplored domains, the question of how completely novel examples influence subsequent generation is an important one" (Marsh, Ward and Landau, 1999, p.98). 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 problem definition. What is novel will be dependent upon the existing domain knowledge of the individual.

4.2.3 Novice Problem Construction and Creativity

What is entirely novel to one person may be well known to another. This can be shown using the example of a picture of a rectangle and a black dot. For most people, the image will cause them to see a door. For most people the image is such a



strong, established representation of a door that they would have difficulty seeing anything else - they have high domain specific knowledge. “Well-organized schema, based on the common features of behavior episodes, facilitate the imposition of habitual interpretations and actions on familiar circumstances, even in the face of considerable ambiguity” Ford (1996). A person who has never seen a door would not interpret the image the same way - they have low domain specific knowledge. The cave dwelling door novice would have difficulties finding an internal memory that results in a strong match. Novices, unlike experts, are therefore more likely to interpret elements of a situation as a ‘novel’ and ‘ill-defined’ problem – the basis for creativity.

The novice’s lack of knowledge means they would open different domains than others, and subsequently they might define the problem differently from most people. Novices will have a different viewpoint, and initial anchor point, from which new interpretations can be generated. They may for example see the diagram as ‘a button’, or ‘the view looking downward on a ‘train’s locomotive’.

Additionally, the novice’s lack of domain specific knowledge will mean they are more dependent upon situational factors when interpreting the problem. Indeed, the fact that an expert has strong internal interpretive schemata might mean that they jump to interpretations without looking at the situational information in depth. As stated by Wiley (1998), “there are studies in many domains that suggest that, in fact, experts tend to consider less information than novice in their problem solving” (Wiley, 1998, p.728). Subsequently, if some critical aspects of the environment have altered the expert may make erroneous evaluations as they miss those changes due to their reliance on well-established interpretative schemata. Therefore, the ‘novice’ mind, and their new perspective, may result in more situation appropriate evaluations of a problem.

The Novice’s Perspective and Solution

The novice, uninhibited by a large amount of stored interpretative schemata, might be able to see the situation for what it is, rather than what it was. However, despite these assertions the likelihood of a novice coming up with better interpretations than the

expert is minimal. Most interpretations generated by a novice will be the same as those already discovered by the expert, and there is only a very small likelihood that any new interpretations will actually be appropriate. In the vast majority of cases the novice's views will not result in a societal level creative solution, and even if a new solution is generated, they are unlikely to have the expertise and knowledge to recognize it as a significant finding.

For most novices the initial interpretations are likely to be interpretations that are already known to the expert. A person driving a car for the first time is likely to apply the brakes when a child's ball comes onto the road. It is a response that for the novice may be creative but from a societal perspective is common. As most people in a society have a wide range of shared experiences and encounter similar environments throughout their lives, a novice's interpretation of a situation is not likely to be significantly different from other people in society. This situation is more pronounced for a novice working in an established field. When beginning my academic career I first looked at the area of advertising research, but found that many of the ideas I thought were new and original were already well researched by my peers. While limited domain specific knowledge means a person is not limited by their existing knowledge, it does not mean that their interpretation is new at a societal level.

Additionally, a new creative solution generated by a novice will still face the problem of societal evaluation. A person who has lived in caves their entire life will have a different interpretation of the rectangular 'door' image. This interpretation will be highly original when evaluated by a society that has knowledge of doors, but that same society will have difficulty in evaluating the ideas as appropriate. However, the case in which ideas are generated from a person coming from a different societal group, or even a different field of research, is highly unusual. Most people when they come across a situation will have had similar experiences in that environment with the others in their societal group, and even more so their field of specialization.

Novice Creative Thinking Costs

A final problem for the novice is the significant processing disadvantage in not having an easily accessible interpretive schema. Idea generation tasks are cognitively

demanding (Ward, Patterson, Sifonis, Dodds & Saunders, 2002), and for a novice a lack of interpretive schemata, or strong domain specific knowledge, might mean significant increases in processing resources are required to evaluate new situations, as an extensive memory search, and cross combinations links, are required. Hence unless there is a very high level of motivation, a lack of easily accessible interpretive memories might mean that the novice ignores the unusual situation cues or satisfices by generating a simple, but inappropriate, interpretation relying on memory categories that are easily retrievable. Additionally, as the distance between domains is dependent upon each individual's memory categories, a novice might be making significant, divergent links, that to an expert are merely similar domain connections.

For a motivated novice there is a high likelihood that they will come up with a solution that is new at an individual level. These novel interpretations of a situation mean that there is also a small chance that they will be able to come up with ideas that are new from a societal level as well. However, in addition to the limited likelihood of their ideas being something that an expert would not have prior knowledge of, most of their ideas will also not be appropriate, as they do not have enough knowledge of the field to evaluate their ideas adequately. Additionally, even if their idea is both original and appropriate, their knowledge and standing in the field may mean that the idea is either never expressed or, if it is expressed, is not accepted within the field.

In summary a novice will have a greater propensity to open what is for them a divergent domain to find a solution to a problem. However, given that we all encounter similar experiences to one another there is only a small chance that this domain is also divergent to the expert. Additionally, the high cost of creative thinking, combined with the need for the novice to develop new memory structures when faced with a new situation will mean that they are unlikely to undertake creative thinking processes under most new situations unless highly motivated to do so. Subsequently, the motivated novice may be undertaking creative thinking processes, but there is only a small chance that this will result in societal level creativity.

4.2.4 Expert Problem Construction and Creativity

While there has been significant research on how problem definition influences the creative process (Getzels & Csikszentmihalyi 1975; Mumford, Baughman, Threlfall, Supinkski & Costanza, 1996; Mumford, Whetzel & Reiter-Palmon, 1997; Reiter-Palmon, Mumford O'Connor Boes & Runco 1997) only limited work has looked directly into the influence of domain specific knowledge on how a person constructs a problem. One study that does so (Wiley 1998), found that "... the present study suggests that the influence of domain knowledge on generating problem representations may also have its costs, putting the experts at a disadvantage when remote associations must be considered or combined in novel ways" (Wiley 1998, p.728). Given that novel combinations are the key to big C creative idea generation this provides a strong potential limit of domain specific knowledge on this type of creative idea generation. Hence for an expert one way in which they might be at a disadvantage is the high cost of novel combinations. At the same time however, an expert may be more motivated to think deeply about issues within their domain despite the high cognitive cost of doing so.

Given that creative thinking is mentally taxing (Ward, Patterson, Sifonis, Dodds & Saunders 2002), intrinsic interest in a domain may lead to a greater propensity for creative problem construction in that domain. Some people are motivated to think deeply in areas of human psychology but have little interest in doing so in areas of mathematical equations, yet for others the reverse is true. The preceding argument supports the tension view of the creativity/knowledge debate. Interest in a domain will lead to greater learning and development of creative solutions to problems in the domain. This will lead in to knowledge and hence expertise. Motivation will lead to more resources being applied to a situation and the generation of solutions. However, once those solutions are well developed as neurological pathways this might result in habitual responses and hence limit further creativity without the deliberate application of cognitive strategies that ensure divergent problem redefinition – the recognition that multiple solutions are possible.

Problem Construction or Setting of the Anchor Points

One of the keys to creative thinking has been identified as the need to create multiple possible pathways to act as the basis for idea generation (Schilling, 2005). Researchers have noted that idea generation tasks may be able to be solved in a number of ways but one universal is the use of prior knowledge both deliberately and/or inadvertently in determining how a person defines the problem (Marsh, Ward and Landau, 1999). However, a limited problem definition, that may limit subsequent novel idea generation, may be overcome through superior problem construction skills (Schilling, 2005). Central to creative problem solving is the realization that a creative response is required. However, the questions still need to be answered in regard to, 'why some people have better problem construction abilities?', and how domain specific knowledge influences problem construction?

It would appear therefore that high levels of domain specific knowledge might lead to automated responses to situations prompted by highly efficient cognitive processes. In other words if the expert is not told that the situation is a problem they may not define it as such and hence not undertake creative thinking. However, in addition to an expert's knowledge leading to the potential problem of automated routine responses, it may also limit their propensity for creative thinking by setting the anchor points for the creative combination process. Given that creative thinking involves the combination and/or reorganization of domain memories, domain specific knowledge will also influence the creative thinking process by influencing the initial domain information used by a person as the starting point for idea generation.

4.3 Set Anchor Points

Figure 4.2: Big C Eminent Creative Ideas versus little c Minor Creative Ideas – Societal Level Model

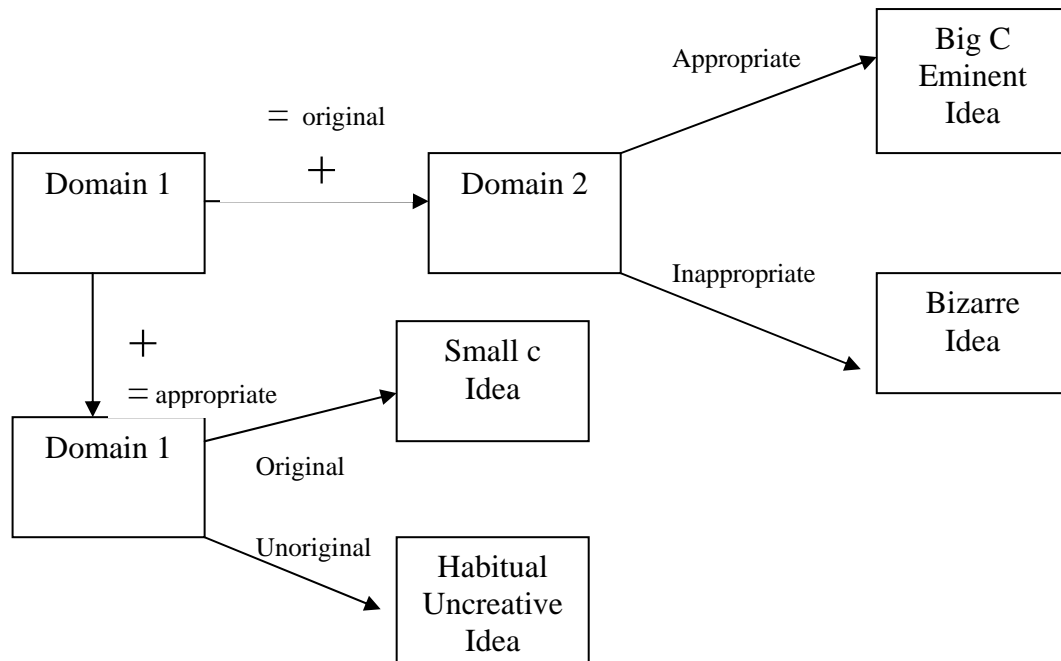


Figure 4.2 above illustrates the creative thinking process. Creative processes require the linking of ideas either within or across domains. Those domain ideas can come from the elements in the environment or internal memories. If the combinations are original but within the domain, small c ideas will be developed. If the combinations are across domains and also appropriate, then big C ideas will be developed.

Even if a person is faced with a situation where they recognize that they do not have a satisfactory solution within their existing domain knowledge, domain-specific knowledge will still influence the anchor points that are used as the basis for combination with other ideas to find a solution. These anchor points or the way in which a person has defined a problem will set the context by which other creative thinking processes are applied (Reiter-Palmon, Mumford, Boes & Runco, 1997). Rather than happening after an idea is generated, like evaluative criteria, the anchor points act as limiting nodes from which ideas will be generated. This concept is best described by the term 'coming to mindness' (Ward, Patterson, Sifonis, Dodds & Saunders, 2002), where through a process defined by the of path-of-least resistance

model (Ward, 1994); when a concept is activated it then acts as the starting or anchor point from which new ideas are developed.

“The model proposes that, although people can adopt a variety of strategies for developing new ideas, a predominant approach is to retrieve specific known instance of the relevant concept and to project the properties of those instances onto the novel idea” (Ward, Patterson, Sifonis, Dodds & Saunders, 2002, p.200),

Subsequently, how a person defines a situation will determine the initial domain, or domains, that are opened. Those domains might be domains that are similar to most other people in society or they might be highly unusual domains; such as the locomotive definition of the rectangular image discussed earlier. The similarity or otherwise will be largely dependent upon the domain knowledge of each individual. As an item's retrieveability is influenced by its representativeness, its typicality, familiarity etc, an expert's strong knowledge structures, due to high levels of familiarity, will mean that they will have extensive related memories that are activated and act as the basis for novel idea generation. Indeed, research by Ward et al (2002) into category structure and imagination found that retrieveability as measured by dominance/rank had the strongest likelihood of being used as the basis for novel idea generation.

As creativity is a matter of linking two memory categories in a new way, an expert's strong knowledge of a particular domain of knowledge means that memory categories from that domain are likely to be the anchor for the new information link, and these anchor points might be so strongly developed that it is difficult for divergent ideas to link in with all the related memories structures. For example, an expert developing new products may face difficulties in that the way they construct the problem and the range of initial anchor points limit their ability to come up with highly divergent ideas. The expert will have many well-developed, dominant memory structures they have established relating to the existing products in the market that act as limiting anchor points from which to develop entirely new ideas i.e. a new fry pan - it has to be round, it has to be made of metal.

These old memory categories may no longer be relevant to the new product, but may still dominate the idea generation process as they provide an erroneous starting point for our memory search and idea generation. Moreover, research has indicated (Marsh, Ward & Landau, 1999), that when engaged in generative tasks individuals do not consider the source of the components of their novel productions. For an expert therefore this may account for the automated processes that limit cross domain divergent idea combinations occurring.

4.3.1 Expertise as Mental Set

Wiley (1998) discusses this problem of limiting anchor points using the phrase 'expertise as mental set', whereby the domain specific knowledge of the expert is posited to set the search space or anchor points and limit creative thinking. In his experiment he showed that when provided with misleading problems experts perform worse than novices and this was due to an early commitment by experts to a solution path. For experts' their highly efficient knowledge structures result in the efficient retrieval processes that lead to solution paths, and limited mental search space (Wiley, 1998). These solution paths set the parameters for our search. This work by Wiley builds upon the research by Ward (1994) and others that used example as primes in creative problem solving tasks. The strong influence of primed information in creative idea generation tasks indicates that those examples act as mental sets limiting the search space of experts.

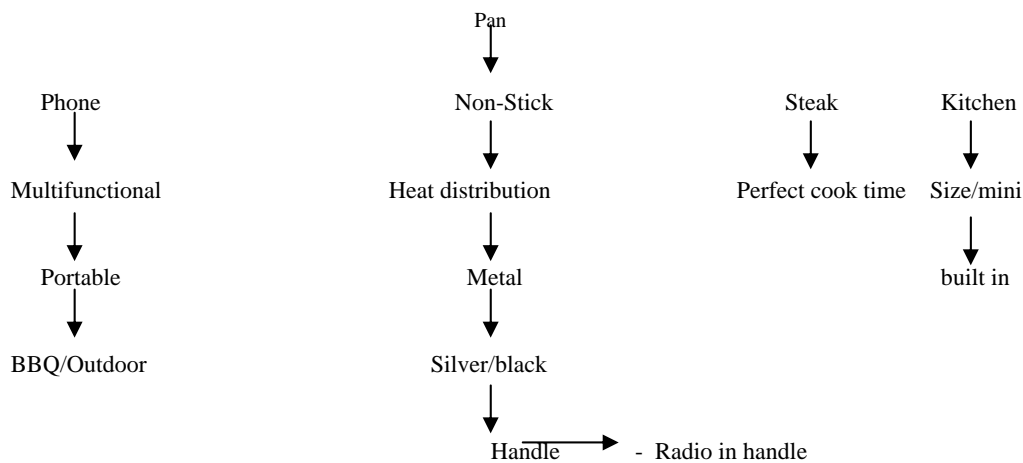
What is not clear is whether this search space, which for an expert should be made up of a very large amount of category memory, will limit the creativity of the response more than that of a novice, who will still have opened less extensive category memories. The answer may well lie in the proposition that the less developed structures of the novice mean that they have to look to, what are viewed by others as more distant categories, to find a solution, while the expert starts by searching through their extensive memory categories. In other words the mental set, which may be an automated response in the expert defined the problem in a ordinary domain way, will not lead to divergent domain combinations occurring. This contention is given support by the experiment of Wiley (1998) where an expert's knowledge was not only

activated by a prime but it resulted in fixation on that primed domain specific knowledge for finding a solution. For the novice the graded structure of memory will mean that their limited knowledge will result in the need to open what are seen as less typical category memories to apply to the problem – Out of the mouths of babes. The novice provides a different perspective as they do not have a well established one. Essentially they define the problem in an unusual way which leads to a greater potential for an unusual solution.

The following example highlights this point. The aim is to develop a new type of frying pan. For the expert a number of memories come automatically to mind such as non-stick, heat distribution metal etc. This sets a large number of anchor points and limits their potential for cross domain combinations occurring as the problem is defined based upon these anchor points and so new idea combinations will need to link with these extensive memories. The novice might start with the thought of steak, as they mainly use their fry pan to cook steak, this leads them in a new direction in regards to the need for a fry pan that cooks steak perfectly each time - maybe with a temperature and time control and various settings. This more divergent thinking process can also be replicated through forced divergent techniques such as telling the person to associate the concept of the fry pan with the word phone. This might lead the idea generator down the line of thought of multifunctional, portable etc.

4.3.2 Anchor Points – New Cooking Utensil

Figure 4.3: Category Connections Model



The parameters for our memory search will be set based upon how we have defined the situation and the memory categories we have opened up. It will be difficult for an expert to access divergent memory categories as they have such well-established memory categories within the domain that their initial idea will have triggered a large number of strong related associated memories. We view information based upon the memory category we have opened up in order to deal with that information. This will limit our ability to think divergently.

“Once I have an argument in my head, it becomes harder to see the words, impossible to see those that differed. I stopped questioning myself, I stopped being creative”. (Anon)

These anchor points essentially act as basis for idea connections (Marsh, Ward and Landau 1999; Ward, Patterson, Sifonis, 2004). They allow us to make more efficient memory searches, however they limit the overall flow of creative ideas as ideas will need to fit in with the memory categories opened as anchor points. Too much domain specific knowledge may limit the unusualness of the starting points from which new ideas can be generated.

4.3.3 Setting the Search Criteria

Additionally, expert knowledge might mean well developed schemata are accessed leading to the increased likelihood that an existing solution is found. The anchor points determine to a large extent where we get other information and our ability to make links. The mechanic with a broken car in the desert will define the problem as ‘needing to fix the car’ therefore setting a large number of anchor points that limit the basis from which other divergent thoughts can be combined. Another person who sets the problem and anchor points as ‘the need to get out of the desert’ will have a much broader range of options with which their anchor points can be combined. The expert sets numerous anchor points and makes alternative appropriate connections to these points harder.

These initial anchor or starting, points, set the search criteria from where we look for ideas, just as an external judgment would, and therefore limit creativity by limiting the

divergence of ideas that we use to make combinations. Indeed, Ward, Patterson and Sifonis (2004) found that more abstract approaches to problem definition lead to more original solutions. New ideas and situational variables that could be used as the basis for combinations that would result in creative ideas may not get past the strict parameters set by the anchor points in our problem definition. The initial thoughts set the anchor points from which ideas can be connected. The more similar these anchor points are to societal views the less creative the outcomes.

The extensive domain specific knowledge of the expert will lead to extensive related memory anchor points being set during problem definition thereby limiting divergent thinking and big C creativity. These extensive memory categories will however provide a strong efficient basis for making/finding links between information within the domain; small c creativity. This is essentially what is encouraged in our academic institutions and may explain the banal nature of many academic findings. For the expert the extensive memories and the close links between those memory categories will mean they are likely to have extensive information running through their heads and new links may be made between these ideas resulting in small c creativity.

4.4 Summary

In developing creative ideas existing knowledge effects have been shown to have a negative effect on creative ideas. Research has shown that people tend to use information provided in the problem as the basis for generating new ideas if more similar within domain information is provided it results in more appropriate but less original ideas and visa versa (Mobley, Doares & Mumford 1992; Finke, Ward & Smith, 1992), therefore an expert's knowledge, if it results in automated processes that bring to mind their extensive memory of the domain, are likely to act as the anchor points for new idea generation and therefore result in more appropriate but less original solutions. However, if they are able to access more distant domain information then their knowledge will act as a broader base for determining and redefining distant category combinations into ones that are appropriate to the domain of application.

Problem definition determines the anchor points for creative thinking. Interestingly the efficiency of the memory retrieval and situation interpretation processes of the expert, resulting from strong memory categories through which to find memory links, may in itself be the strongest limitation when it comes to developing highly creative ideas. Not only might strong memory categories result in finding quick habitual unoriginal interpretations of a situation, once those memory categories are opened, i.e. the door, they will act as the basis by which further internal memory searches are made and be the basis for cross memory links – we will look at door type solutions once this is the memory category opened.

For experts, without the use of forced divergence techniques, strong memory categories are likely to exist that allow habitual interpretation of most situations with a low level of cognitive effort. Indeed, a number of experiments have shown that experts are still reliant on the initially retrieved memories in novel idea generation even when they are given explicit instructions to avoid doing so (Marsh, Ward & Landau, 1999; Ward, Patterson, Sifonis, Dodds & Saunders 2002). They are therefore likely to be able to quickly develop interpretations of situations that are highly appropriate, but not highly original. The known solutions mean they will not look at a situation differently. Additionally, once a memory match has been made this will act as the starting point from where any cross memory leaps are made. “What you want to know determines what you do, and the limits of the findings” (Vaughn, 1983, p.46).

Knowledge in an area is used to determine the dimensions of the problem. The more domain-specific knowledge we have the more likely we are to develop very specific problem definitions and anchor points that influence our subsequent memory search. If we are too specific with the problem definition then this essentially, and severely, limits our ability to come up with cross memory solutions or original ideas. Therefore, without the use of creative techniques or external influences, this problem definition stage essentially determines the types of outcomes that we are going to come up with.

Additionally a person's domain specific knowledge may in part relate to outdated knowledge that acts as both the basis for initial problem definition as well as the parameters for idea combination and subsequent internal idea evaluation, refinement and expression. Current evaluation criteria and knowledge may no longer apply as the situation has changed. A person without this limit of past knowledge will be able to see the situation from the new perspective and provide new solutions that are not limited by those now erroneous evaluation criteria, or anchor points, that may no longer be appropriate. The limit for the novice is the very high cost of idea generation processes when they have to establish extensive memory links merely to interpret the situation. Therefore the U shaped knowledge/creativity model may be more realistic.

In summary, the more well developed a particular dominant interpretive schema the more likely it will be used as the basis for interpreting a situation. Domain-specific knowledge therefore has a significant influence on how we interpret situations. Experts are much more likely to be able to interpret a situation quickly using existing category memories and therefore come up with habitual non creative or small c creative solutions. As noted by Marsh et al 1999, if a person has a large amount of 'unconstrained' prior knowledge with boundaries of knowledge that overlap, then they should be able to develop better quality solutions. However, given that expertise often requires concentration on a particular area, and therefore situational factors will result in a large number of easily retrieved information from within the same domain to be accessed, this information is likely to result in advertent plagiarism and reduced novelty of responses. Responses will come through connections within the domain, but are less likely to come from across domains.

4.4.1 Big C Vs. Little c Implications

Big C creativity may be limited by domain specific knowledge as domain specific knowledge limits the problem definition and anchor points. However, for small c creativity these factors may work to enhance this type of creative process as people focus on linking thoughts within the existing domain. Undoubtedly most creative ideas are small c creative ideas. Small c creativity relies on domain specific knowledge; the need to know the field well enough to link previously unlinked areas within the domain. The expert's extensive highly structured memories will increase

the likelihood of new integrations of information from within the domain. The rigid basis of interpretation will also mean that the parameters for memory search set by the expert will be more stringently defined than that of the novice, limiting big C outcomes.

Our domain specific knowledge, once well developed, restricts our ability to develop new ways to define the problem that would result in major contributions. Once we have extensive knowledge of a particular domain we can keep on making small c creative contributions at relatively low cognitive cost. Even if the expert recognizes that a creative solution is needed their extensive domain specific knowledge will result in the opening of memory categories that set the anchor points that will encourage small c not big C creativity. However, extensive knowledge will assist other stages of the creative thinking process, in particular the refinement and expression of ideas. These issues are the focus of the next chapter.

The research based findings of this chapter support the U shaped influence of knowledge on creative thinking, at least in regards to idea generation. Low levels of domain specific knowledge will mean that not enough cognitive processing resources are free for creative idea generation, too high levels of domain knowledge will lead to stringent problem definition with the anchor points being set too rigidly to allow for cross domain combinations to occur.

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Internal Evaluation and Refinement, and Idea Expression**

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5.0 Idea Generation and DSK

The question discussed in this chapter is: ‘how does domain specific knowledge influence idea generation, internal idea evaluation and refinement, and idea expression?’ To produce societal level creative ideas requires the merging of memory categories in new ways. This relates to stages one and two of the four stage model. During stage one, problem definition the initial anchor points, or mental space, (refer chapter 4) are set. During stage two, idea generation, domains are opened to access ideas to combine with those anchor points and generate new ideas. The previous chapter discussed how domain specific knowledge influences this process, in the first stage - problem definition. In order to understand the effect of domain specific knowledge on idea generation, an analysis of how creative idea generation occurs is required.

The process of creative idea generation in the four stage model relates to the connection of the initial memory categories opened upon encountering a situation, the anchor points, with other thoughts. The distance between the ideas that are being combined determines if the resultant idea is either a) a big C eminent, or bizarre, idea or, b) a small c creative idea (refer Chapter 2). If the idea is the result of the combination of divergent domains the idea will be either big C or bizarre. The appropriateness of the idea in relation to the domain will determine if the idea is big C or bizarre. If the idea is a new combination of ideas from within a domain it will be small c. Therefore, the originality of the idea will be determined by the unusualness of the domains opened; either the original domain that determines the anchor points, or the domain that is opened to which combinations are made.

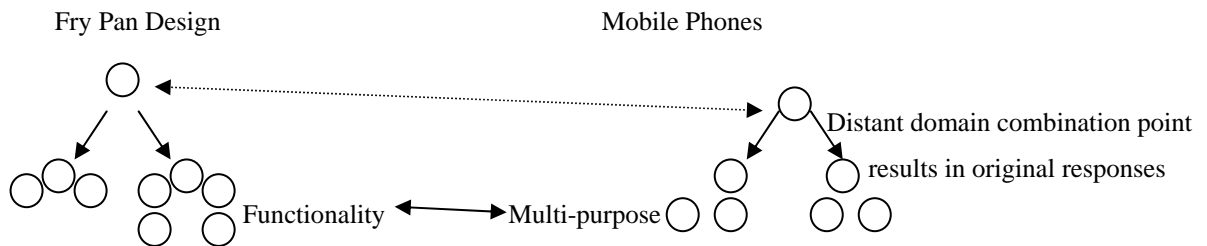
This domain combination process is similar to that proposed by Baughman and Mumford (1995). They reasoned that the combination process involved a process of: identification of key elements of a problem, mapping key features from one category to another, combination of shared features to construct a new 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 and Creative Ideas

Network diagrams are a good way to illustrate how creative ideas are generated and how the degree of similarity between domains 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).

Figure 5.1: Domain Combination Model



Combining these network models of cognition with the domain combination model introduced in chapter 3 and the four different types of cognitive response (big C, bizarre, small c and habitual ideas), provides a basis for understanding creative idea generation and the effect on this process of domain knowledge. The anchor points will be determined by the initial domain opened, and if no solution is found within that domain or a person chooses to undertake cross domain thinking processes, then the divergent domain opened will provide the points for the creative combination process. The more distant the new domain that is opened from the initial domain used as the anchor point, the more original the response.

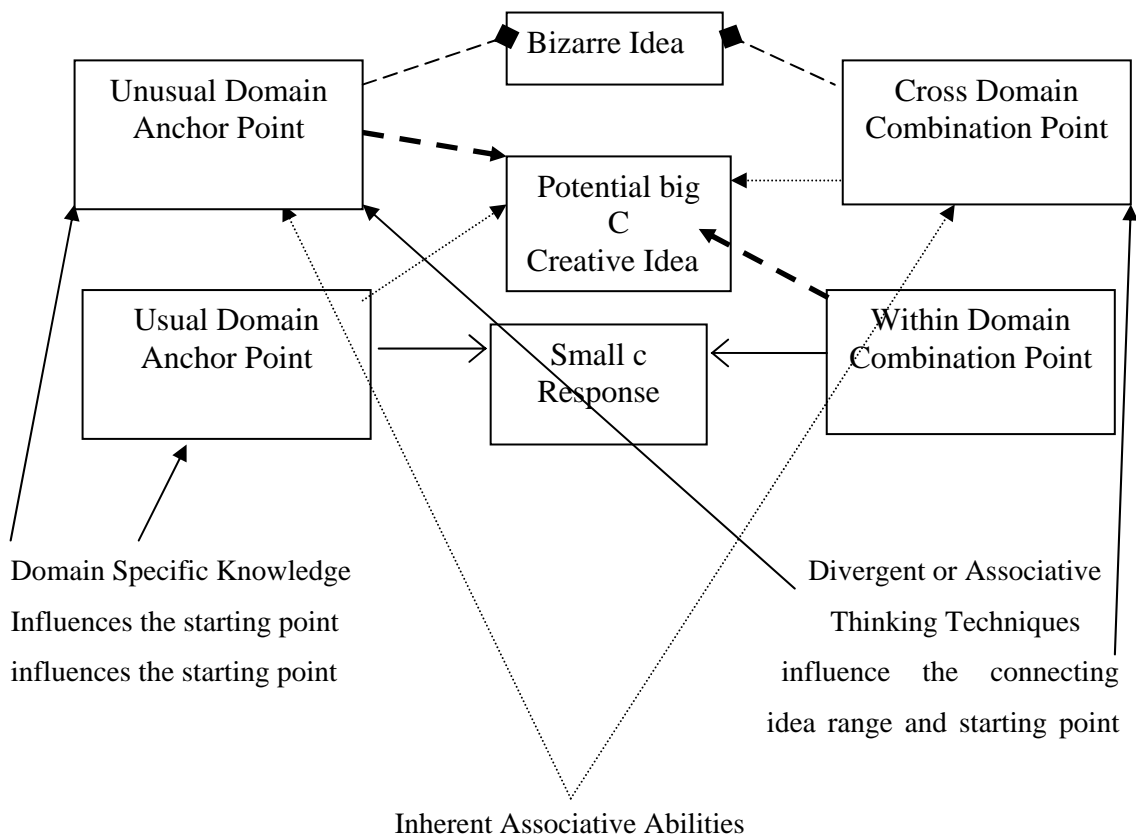
If similar domain information is used in the combination process this will result in small c creativity. Subsequently, it is posited that either the initial domain that is

opened, or the domain that is opened for the combination process, will determine the degree of creativity of the resultant idea. Hence either setting unusual anchor points (problem definition), or the selection of creative cognitive strategies or techniques to open distant domains for use in the combination process, can result in big C creative outcomes. Four potential combination options result from the different types of domains that can be opened as either anchor points or combination points.

1. Unusual domain anchor points + within domain combination points
2. Unusual domain anchor points + cross domain combination points
3. Usual domain anchor points + within domain combination points
4. Usual domain anchor points + cross domain combination points.

5.1 Model of the Creative Combination Processes

Figure 5.2: Model of the Creative Combination Process



5.1.1 Unusual Domain Anchor Points + Within Domain Combination Points

Various scenarios in relation to both the original domain opened and/or the connecting domain opened are possible. A person could define the problem in an unusual way, in other words they have opened a domain that would not normally be used by others. If the problem is defined unusually the initial anchor points increase the tendency for a creative response. For example with the new product development problem a person could define the problem as the need to increase cooking speed rather than how everyone else has defined the problem which might be - the need to develop a new fry pan. If they then look for ways to increase cooking speed they might come up with a new solution - such as using a concentrated microwave device that can be attached to a saucepan to concentrate heat on certain areas of a dish that need longer cooking time. The result will be more original as other people's anchor points mean they have been looking at another domain for an answer.

5.1.2 Unusual Domain Anchor Points + Cross Domain Combination Points

Alternatively, a person could define the problem in an unusual way, and also open a distant domain to use in the combination process. For example a person could define the problem as the need to increase cooking speed and then add in the thought of outdoors as the basis for idea combinations. The result may be the use of a concentrated sunlight cooker. For people developing a fry pan this highly unusual response might prove difficult to understand and therefore be viewed by them as bizarre. In time, and/or to people working in an alternative domain i.e. reducing the dependence of the poor in third world countries on outdoor wood fire cooking, it may be viewed as a creative solution.

5.1.3 Usual Domain Anchor Points + Within Domain Combination Points

Alternatively the domain that is opened as the basis for combinations could be the same as the original domain used in the anchor points. This will either result in habitual or small c combinations. The response might be to develop a better fry pan through using lighter weight materials. If a response is not a new combination then it

is a habitual response. It is important to note again that a response might be new at an individual level, but not a societal level.

5.1.4 Usual Domain Anchor Points + Cross Domain Combination Points

Finally the anchor points could be the usual one but the combination points are from a divergent or unusual domain. For example, the problem may be defined as the need to develop a better fry pan but then the distant category of mobile phones is opened up and this results in a multifunctional fry pan that has sides that can be extended so it also acts as a saucepan. This, as in the first scenario, would result in original ideas that were more easily interpretable by people in the original domain. What is critical to the creative process are the domains used in this combination process. Divergent thinking and originality can come from either the initial anchor point domain or the combination domain.

Additionally it is important to keep in mind that this model must be viewed from a societal perspective. A novice might generate an idea which to them involves new anchor points and crossing domains but to an expert would be merely a habitual response. This diagram is therefore a societal level diagram. Support for this diagram can be found in the literature and theories on idea generation.

5.2 Theories of Idea Generation

While there is recognition in the literature that creativity requires some type of combination process (Mumford, Mobley, Uhlman, Reiter-Palmon & Doares, 1991; Mumford, Whetzel, Reiter-Palmon, 1997; Engle, Mah & Sadri, 1997; Mumford, Baughman, Maher, Costanza & Supinski, 1997; Scott, Longergan & Mumford, 2005), there are few concepts that discuss the processes that underlie idea generation. One such concept that does provide some insights into this idea generation process is that of transfer. Guilford (1968) talks about taking information from memory and applying it in new contexts as transfer learning.

“Information recalled for use in a new form or in a new connection is a phenomenon of transfer. A thing learned in a certain connection is torn out

of the context in which it was learned for use in some new context”.
(Guilford, 1968, p.124)

Essentially the creation of creative ideas in the domain combination model refers to a person transferring, or combining, information that was learnt for use in one area to another area i.e. the use of their knowledge of mobile phones to apply to designing fry pans.

Therefore, this concept of transfer is similar to the domain link argument proposed in this thesis as the process of transfer is the ability to connect memory categories in new ways. Work by Barnett and Ceci (2002) develops the concepts of transfer and they note that the underlying cognitive skills required for far transfer may be the same ones that underlie creative thinking. Far transfer is the process whereby an individual is able to take what they have learnt and apply it to a distant context (Barnett and Ceci, 2002), whereas near transfer is where an individual applies their knowledge to a similar context.

This concept of near and far transfer relates well to the concept of domains, and big and small c creativity. A person faced with the need to develop a creative response who applies far transfer is looking at applying their knowledge to a distant domain or context. They are able to apply what they have learnt in one domain to a distant domain setting. Near transfer will result in habitual or small c ideas and far transfer will result in big C or bizarre ideas. The question then asks itself: what is the influence on transfer of domain specific knowledge?

5.2.1 Specialist versus Generalist Knowledge and Far Transfer

It could be posited that as domain knowledge provides both the anchor points and combination points for creative ideas, greater knowledge should enhance the propensity for far transfer. As noted by Barnett and Ceci (2002) a person will be more able to apply far transfer if they have learnt a concept in depth and were motivated to learn it well. It would follow therefore that strong domain specific knowledge of both the initial domain; relating to the problem, and other domains, could act as potential combination points and should facilitate far transfer during idea generation. Therefore central to far transfer and big C creative thinking might be generalist rather than

specialist knowledge, as knowledge of more than one domain is required in order to achieve cross domain combinations.

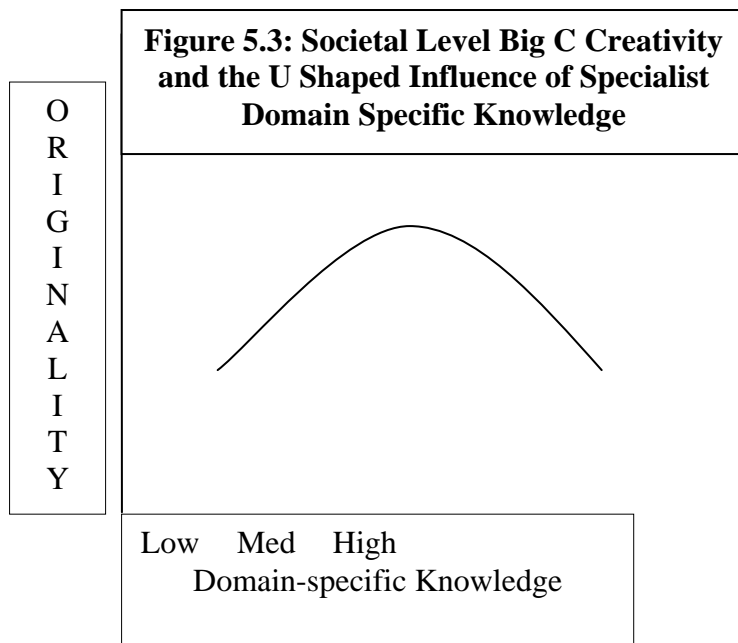
As discussed in chapter four, stringent, well-defined, narrow problem setting will limit the points that will be accessed for a solution. Habitual processing and limited problem definition will inhibit creativity in the expert. However, broader problem definition should allow the expert to access their wide range of knowledge of the domain to find a big C solution, as long as the person has a broad knowledge of not just the domain by which they have defined the problem, but also alternative domains for new combinations to be made during idea generation. As noted by Ford, “Prior learning, especially when it produces diverse knowledge, improves an individual’s ability to acquire new knowledge and to utilize that knowledge in creative ways” (Ford, 1996, p.1124).

Domain specific knowledge also acts as the alternative memory categories to which cross memory jumps are made. Given that big C creativity requires combinations of diverse domains an expert may have problems due to specialist knowledge. A limit in developing big C solutions for the expert is the need for those cross domain links to occur. To acquire expertise in a particular discipline usually requires specialization in that particular domain. This may greatly assist an expert’s ability to generate small c creative ideas but limit their ability to develop big C ideas. Their concentration on a particular area limits the time and resource commitment toward knowing other domains that could act as the basis for cross domain links (McLaughlin, 2001). Kasof (1995) highlights this issue when he states the example of Festinger, an academic who is considered highly creative because he did not continue to research in areas he had already developed, he moved from field to field. This movement to multiple fields would have allowed Festinger to acquire knowledge of multiple domains that could be used as the basis for big C ideas.

Hence there may be a catch with knowledge acquisition, and in particular specialist knowledge, in regards to big C creativity. The specialization in a particular domain may lead to the ability to quickly and efficiently interpret information within that domain at very low cognitive cost. Additionally, that knowledge should also allow for significantly lower costs in regards to making connections between ideas from within

that domain – small c creativity. However, the cost of this specialization is the limited knowledge of alternative domains that act as the basis for combination points and therefore a lower propensity toward big C creativity. Finally, the expertise may result in habitual and automated responses meaning problems are defined stringently and thereby also limiting the anchor point domain. In support of this contention is the finding by Simonton (2003) that “..., notable scientists tend to read widely, including in areas outside their main discipline (Simonton, 2003, p.479)”

Subsequently, it may be that Guilford (1968) was correct when he proposed that it is not too much knowledge that limits creativity but how that information is stored. Focused expertise in an area may limit creative thinking due to automated processing, limiting anchor points and a lack of alternative domains as combination points. A diverse range of knowledge of different fields will allow opportunities for the cross fertilization of ideas and distant domain links to occur, Schilling’s (2005) ‘aha’ moments, and for these links to be developed in a way that is understood within at least one of the domains. Specialist expertise will increase the propensity for small c solutions and numerous small c additions will still move the field out significantly as the edges of the domain expand. However, this gradual development will not be recognized as significantly creative.



However there is another issue in relation to domain specific knowledge and idea generation and that is that there might be minimum level of knowledge that is required in order to generate ideas. While too much knowledge may result in habitual responses and stringent problem definition, as well as a specialization in a narrow field, too little might mean that the person does not have any basis for developing new combinations. Additionally the novice may be spending significant cognitive capacity just interpreting a situation and not have the necessary processing capacity free to apply to new idea generation. Therefore, there might be a minimum level of knowledge that is required before creativity can occur, while specialist knowledge beyond a certain point leads to a drop off in creativity.

5.2.2 Overcoming Domain Specific Knowledge Limitations

A final issue is the fact that specialist knowledge may be overcome through the use of techniques or environmental circumstances that force strategy two or cross domain thinking. These creative thinking techniques allow far transfer to occur for the domain expert.

Being a specialist will lead to more small c, incremental creativity. Being a generalist will allow for more basis for big C, creative leaps to occur. As noted by Marsh, Ward and Landau 1999, if a person has a large amount of ‘unconstrained’ prior knowledge with boundaries of knowledge that overlap, then they should be able to develop better quality solutions. Subsequently, too much knowledge in one particular area may in fact be the problem, rather than too much knowledge. As noted by Schilling (2005), if distant creative combinations are required between distant domains, the extent of a person’s knowledge of both of the domains will influence the extent of the node connections that are then made. This is given support by research by Dowds (1998) that discusses the importance in teaching with an interdisciplinary approach in order to provide both the necessary knowledge for creativity while at the same time not narrowing down the focus to such an extent as it necessitates the focus of each discipline as stand alone and unrelated.

Wiley (1998) acknowledges this tension in creative thinking. An expert’s extensive domain knowledge is needed in order to make sense and refine highly original

solutions but that knowledge may lead to mental set fixation which means that those solutions are not able to be generated in the first place. Indeed, the finding that it takes ten years before a person produces their highly creative work may be more a case of taking ten years to develop the cognitive structures which allow your idea to be defined and refined to an extent which is acceptable to the field.

Not only will a generalist's knowledge, or the use of creative thinking techniques, enhance the potential for big C solutions, situational factors could lead to divergent memory categories being opened and more original answers emerging. Given a broad problem definition, situational elements from distant domains might trigger cross category idea combinations and big C creative ideas. The work by Mumford, Whetzel and Reiter-Palmon, (1997) can be related to this point. They found high cue inconsistency leads to better quality and originality of people with high problem construction ability. It may that be given broad problem definition skills, high cue inconsistency forces people to open divergent memory categories and go beyond the current information to find more distant ideas for the creative combination process. "the tendency to discount inconsistent observations may limit the success of people's creative problem solving efforts" (Mumford, Whetzel & Reiter-Palmon, 1997, p.6).

Often the information that comes for creative ideas comes from the environment. When a person is thinking of an issue but is unable to think divergently, other information from the environment may act as a basis for cross-fertilization of memory categories. While this process of environmental roulette invariably occurs, we do not know whether some people are better able to incorporate environmental information with internal information than others to solve problems. Some people may have a greater propensity to jump memory categories, although it is proposed that a greater influence on individual creative outcomes will be knowledge and skill of creative thinking techniques and motivation.

5.2.3 Methods to Overcome Domain Specific Knowledge Limitations

In order to avoid habitual responses and limiting anchor points the expert needs to be able to provide himself or herself with an opportunity to bring in information from other domains to complement their specialist domain specific knowledge. One of the

biggest problems for the expert will however be their lack of knowledge, or exposure, to alternative divergent domains. Subsequently, the question still begs itself ‘how do significant combinations of ideas across domains occur?’

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. Divergent thinking techniques have also been shown to effectively increase the creative output of training participants (Clapham, 1997; Scott, Leritz, & Mumford, 2004).

So it can be posited that big C creativity requires certain circumstances that allow cross domain links to happen such as a person working on, or exposed to, multiple domain problems and/or the use of forced divergent thinking techniques. Although domain-specific knowledge can limit big C creativity, as it results in situations either not being defined as problems, stringent problem definition and/or stringent search criteria, these limits can be overcome through a range of creativity techniques and/or situational factors (Amabile, 1995).

5.2.4 Factors allowing Domain Specific Knowledge Limitations to be Overcome

One such situational factor that may allow a person to overcome stringent anchor points or fixation is incubation. An experiment by Wiley (1998) gave support for the contention that an incubation period assists in creativity by providing time for a person to encounter more distant relevant cues to find a solution. This overcoming of fixation appears to be due to the incubation period providing respondents time to move away from the limiting memory set (Finke et al, 1992) This need to bring in more remote associations has been of continued interest in the creativity literature since Mednick (1962) first introduced the concept of remote associations. Rather than having to wait for opportunities for cross domain information to become available, an incubation period or creative thinking techniques can force this same effect.

The use of forced divergence creativity techniques during problem definition and idea generation should encourage the cross domain combination process. Forced divergence techniques allow us to bring in divergent information as a cognitive strategy and overcome habitual and common responses. They are essentially the same process that occurs when a person is exposed to multiple environmental cues or different situations. In a review of creative thinking techniques by Scott, Longergan & Mumford (2005) the authors suggested that divergent thinking represents a distinct and important capacity for creative problem solving. Creative thinking techniques invariably involve some type of divergent thinking technique that encourages cross domain combinations to occur. As noted by Scott, Longergan & Mumford (2005), the weight of evidence points toward the importance of an individual's combination abilities in their creative success.

While creative thinking training has been shown to have long term benefits (Scott et al 2005), there has been only limited research into the reasons for effects of creative thinking techniques on different stages in the creative thinking process (Clapham, 1997). Research by Clapham (1997) indicated that the effects of creativity training is largely attributable to the instruction of simple idea generation techniques. The use of such creative thinking techniques might assist in providing both broader problem definition and the opening of more distant domains for potential combination. Given the use of such creative thinking techniques, general knowledge should be an advantage as it will provide a wider range of potential knowledge to link with.

Figure 5.4: Societal level big C creativity without creative thinking techniques/environmental influences

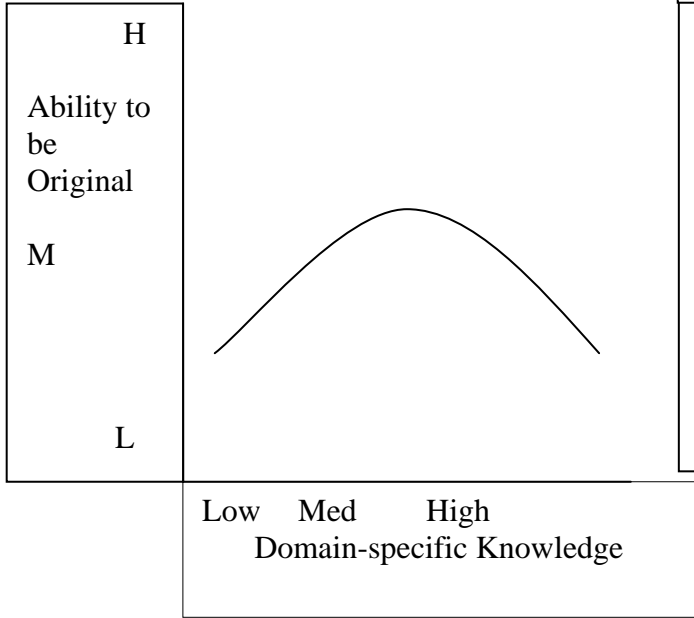
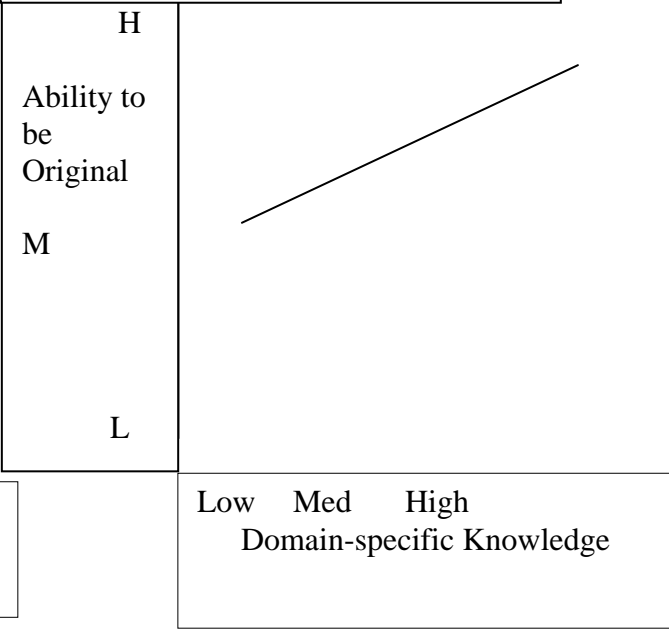


Figure 5.5: Societal level big C creativity with creative thinking techniques/environmental influences



5.3 Idea Refinement

Having a creative idea in itself is not enough to achieve creativity. The appropriateness of the idea will be determined by peers in the domain. As noted in the four domain combination options discussed earlier, experts in the domain of either the anchor points or the combination points will need to evaluate and accept that new idea. A novice may develop numerous cross domain combinations but not know whether the idea can be made appropriate to either or both of the domain gatekeepers. Idea refinement is the process of extending category links and providing justification or explanation for the creative idea within the domain.

As we develop ideas we evaluate them internally and refine them. It is important to differentiate between internal evaluation and external evaluation. External evaluation is where ideas are judged by others. External evaluation of creative ideas has long been a problem in creativity, it was an highlighted by the advertising creatives interviewed during the qualitative analysis (refer chapter 6). The problem with

evaluation is that it requires some type of domain specific criteria to act as the basis for judgement. Creative ideas however, especially ideas that result from the merging of distant domains, are difficult to evaluate as by their very nature others do not have the knowledge to evaluate them. Ideas that are too novel may not be accepted (Nickerson, 1999).

A person with strong knowledge will have difficulty evaluating new divergent combinations as appropriate given their existing knowledge-based evaluation criteria. An expert therefore may overlook creative ideas as they do not fit into the criteria set from within the domain. The well-developed evaluative schema of the expert may even mean that, on occasion, the evaluative process is an automated response. Indeed, many significant breakthroughs in a number of fields, such as the electronic wristwatch, did not pass the evaluation criteria of the domain at the time (Nickerson, 1999). A person without extensive domain specific knowledge might not know an idea is inappropriate and therefore may pursue it where an expert rejects that idea. This may allow further development and changes to the idea which increased its appropriateness.

“Much of the work in science and art that has been recognized as extraordinarily creative ideas has not received this recognition until long after it was done; many products that have eventually been judged by society to be valuable or useful were considered worthless or worse when first produced” (Nickerson 1999, p.393)

In regards to external evaluation, mental fix fixation or stringent anchor points may limit the ability of the expert to positively evaluate the cross domain knowledge combinations of others. However, a novice in that domain may be an expert in another domain and bring in their alternative domain knowledge evaluative criteria in evaluating that same idea. This will allow them to evaluate an idea from a different perspective and hence evaluate an idea as appropriate where by the criteria of another domain it is viewed as inappropriate. Stringent evaluation criteria from one domain might therefore count against big C creative breakthroughs. By setting less stringent anchor points, i.e. defining a problem more broadly, alternative domain information has a better chance of being used as the basis for the combination process.

There is however a trade off in the setting of stringent versus less stringent anchor points or evaluation criteria. Less stringent anchor points will allow more cross domain responses to be generated. However, the connection of distant domains can produce both big C ideas and bizarre ideas. A person generating a large number of responses to a problem will generate only a very small number that may end up being appropriate to one or other of the domains, therefore without a basis for evaluation a large number of ideas may be pursued with a large wasted expenditure in time and resources. Evaluation is therefore critical to ensuring the appropriateness of solutions. “But evaluation for the sake of efficient scanning, where there is good strategy in the scanning process, should be beneficial” (Guilford, 1968, p. 105)

Critical to the process is therefore the evaluation criteria, or the ‘good strategy’, used to evaluate creative ideas. If big C ideas are to be encouraged then more lenient evaluation criteria should be provided. For small c creativity stringent evaluation criteria should be provided to encourage the generation of within domain, appropriate solutions.

5.3.1 Internal Evaluation and Refinement

Big C creative ideas are difficult for others in the domain to judge as appropriate. This is because people evaluate big C idea based upon their current domain specific knowledge. As the idea generator presumably developed their big C idea through the process of insight, it will be difficult for other people to see those same novel cross domain connections. Other people will be attempting to evaluate the idea but based upon old premises and will have difficulty understanding the insight connections.

As per Schilling’s (2005) ‘small world network’ explanation of insight, insight occurs when a person connects two previously unconnected ideas in memory. Therefore, if a person has had an insight they have connected two previously unrelated concepts and so, unlike an external observer, have made the connection between those ideas. If that idea generator is a novice of both domains that combination might appear significant, but their lack of knowledge means that if the idea is a solution already known to the domain they will not realize this; they have developed an individually creative solution but not a societal creative idea. Moreover, a lack of expertise in either of the

domains will mean they do not have the category memories to make extensive domain links and make the idea appropriate to either domain.

However, if an idea has been generated by an expert their extensive knowledge structures will mean they are in a better position to develop extensive memory links. So while domain specific knowledge can limit the anchor points, or evaluative criteria, prior to idea generation, if an idea has been developed by an expert they should be in a better position to evaluate that idea based upon their domain knowledge and refine it so as to be appropriate to others.

Once an expert has made a cross domain combination their extensive knowledge of one or both of those domains should allow extensive additional category links to be made – idea refinement. This refinement process will provide additional connections to be made that will increase the appropriateness of the response and increase the likelihood that others will also be able to see those connections. This idea refinement stage is akin to the Geneplore model suggested by Finke, Ward and Smith (1992), where ideas are first generated and then explored further in a cyclical process.

The different requirements for idea generation and idea refinement are important to note, as idea refinement requires knowledge that must be learnt through time and effort while relaxing anchor points or thinking across domains is a processing strategy that can be learnt and applied when and where it is needed. As noted by Nickerson (1999), there is a need to distinguish between lasting traits and temporary mindsets that are applied as part of a problem solution. A person may choose to apply an uncritical strategy in order to develop a large number of ideas but then apply their extensive more normal logical traits to refine the resultant ideas.

What these suppositions propose is that it could be argued that both divergent and convergent thinking capacities are required for creativity (Nickerson, 1999). “The question of whether creativity and criticalness are correlated (positively or negatively) or relatively independent in the population is an empirical one” (Nickerson, 1999, p.397). While Nickerson and others state that too little structure may be as limiting to creativity as too much, it may not be the amount or lack of structure that is important, but the timing of it.

After the idea generation stage, domain specific knowledge might also benefit creativity by allowing ideas to be made acceptable to the domain. Domain specific knowledge should also provide the basis to develop strong supporting arguments to illustrate the appropriateness of an idea to others. While big C ideas will still contain divergent domain concepts, domain specific knowledge in just one of the two domains will provide the basis for arguments that can be used on others in order to gain acceptance of the idea. For a novice there is the problem that they might have a significant idea but they do not have the domain specific knowledge needed to fully articulate and/or defend that idea. Subsequently they are unlikely to express it.

5.4 Expression - Group Pressures

While creators inevitably gain from the knowledge and expertise of others in their social group (Lemon, 2005), social pressures are also a major hurdle to creative expression. Achieving acceptance of highly original creative ideas is probably far more difficult than actually generating those ideas; given that other people will evaluate those ideas based upon their current domain knowledge. Creative ideas involving more distant category links will be difficult for others to understand as appropriate:

“An extraterrestrial that deviated greatly from known Earth animals might not be recognized as an animal at all, and by analogy, a new product that deviated too greatly from other members of its product class might not be accepted by consumers at all” (Ward, Patterson & Sifonis, 2004, p.8).

Subsequently, unless a person is highly confident in their position within a group they are unlikely to express those highly divergent ideas. For people who are new to a group, or whose role within that group does not engender respect, it is unlikely that they will be comfortable expressing creative ideas. Social issues will be a major consideration in creative expression (Weisberg, 1999).

Undoubtedly many creative ideas are not expressed as the creative individual is unsure of the response from the group or they do not have the domain knowledge to

connect it with the domain so that others can understand it. Domain specific knowledge will lead to a degree of respect and power within a group and should therefore facilitate creative expression (Nickerson, 1999). Added to this social factor is the issue of motivation. Given the problems of gaining acceptance of creative ideas, an individual will need to be significantly motivated, be it through social or other rewards, before they propose a highly creative idea in a group setting.

It is also unlikely that most people who come up with inventive ideas are able to achieve acceptance of that new concept without significant effort and strong communication skills. A review of the literature highlights a range of personality, social and articulation issues that have been identified as critical to creativity (Barron and Harrington 1981; Eysenck, 1993; Weisberg, 1999).

Personality will have an effect on creativity at different stages of the creative thinking process. There has been significant work on the range of personality factors that are characteristic of the creative individual (Barron and Harrington 1981; Eysenck, 1993; Weisberg, 1999). The creative person is open-minded, they view information and become aware of it rather than making a judgment on it. The creative individual is more perceptive less judging. These findings support the contention that a broader base of domain knowledge should be accessed in developing creative combinations. An open personality should lead to an increased likelihood that a person will broadly define a problem and also be open to a wider range of divergent domain knowledge to access in developing new creative combinations. These types of personality characteristics are likely to influence the problem definition stage of the creative process.

Other aspects of personality may relate to the stage of creative expression. It has been noted that creative individuals tend to be self assured, and have a high level of self efficacy. Indeed, creative individuals may be less prone to social pressures and hence more likely to express ideas in social settings without concern about negative responses. In support of this, research has found that anxiety has a negative effect on ideation (White, 1968; Freeman, 1983) A large number of personality factors relate

directly to the tendency to express ideas. However, it is important to note that these, and other, characteristics are not determinant of a person's ability to generate creative ideas, just determinant of their ability to express and gain acceptance of those ideas.

A person might score highly on a divergent thinking test – the basic requirements of originality, but not rate on expression elements. With low levels of expression skills creative ideas will not be recognized so neither will the individual's creative talent. Without this expression an idea will never become a societal level creative breakthrough. In developing our society we must account for expression elements as a major issue in reducing the level of creativity in society, and look at ways that everyone's creative potential can be encouraged.

In summary, as at the idea expression stage the idea has already been developed, the effect of domain specific knowledge should be positive. Experts are more able to argue a creative idea given their knowledge of the appropriateness criteria used in the domain. The expert's status within the domain should also increase the tendency for people to listen to their divergent ideas and supporting arguments. Moreover, the expert will have a degree of success within the domain and will be comfortable with the social groups of that domain. Finally, expert knowledge in a domain will generally also be coupled with a degree of seniority and therefore the ability to take advantage of the rewards accruing to creative outcomes.

5.5 Chapter Conclusions

Extensive specialist domain specific knowledge may encourage small c creativity and limit big C creativity during the problem definition and the idea generation stages. During idea refinement domain specific knowledge will allow more links to be made and the appropriateness of ideas developed. Additionally, domain specific knowledge will assist the expert for all types of creative output during idea expression.

Given that most people specialise in a certain field, and therefore may not be exposed to information from multiple domains, a specialist with extensive knowledge of a field

may be more likely to come up with small c ideas - ideas that link information within a field in new ways. Any ideas that are a result of some type of reinterpretation of existing knowledge of a domain are small c ideas and some of these may result in significant developments of the field. Additionally gaining recognition and acceptance of these ideas will be far easier than for big C ideas, as other people in the field will be able to integrate these findings with their existing knowledge structures relatively easily. The expert will also possess the status and reputation in the field that facilitates idea expression.

Big C creativity to occur requires connections between highly divergent memory categories combined with the ability to express those ideas successfully. To avoid the problem of fixation, the DSK problem of habitual thinking in relation to problem definition and idea generation, may require the use of problem redefinition techniques, forced divergence techniques or the exposure to multiple stimulate. For small c creativity to occur does not require these cognitive strategies but rather a concentration on aspects of the task at hand and prior field based knowledge.

In conclusion specialist DSK will result in more small c than big C results unless the expert has a knowledge of creative thinking techniques, or environmental factors such as chance encounters and social influences, lead to divergent cross domain combinations. Once a cross category leap has been made by an expert they are in a better position to realize it and take advantage of it. To test the proposition that domain specific knowledge can limit creative thinking but also that divergent thinking technique can overcome this limitation requires an analysis of people involved in the creative thinking process. As mentioned in chapter one, the advertising industry is one of the few industries where people specialize in creative idea generation, therefore qualitative research was undertaken at advertising agencies. This research is the focus of the next chapter.

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6.0 Qualitative Research

In order to develop a better understanding of the creative thinking process qualitative research was undertaken. The primary aim of this exploratory research was to identify research questions. Advertising agencies, and in particular advertising creative personnel (primarily copywriters with some art directors), were chosen as the basis for study. The advertising industry was chosen as it employs people primarily for their ability to develop creative ideas without the need for other technical research skills (creatives – copy writers and art directors). The job focus of advertising creative personnel is on the generation and development of creative ideas. Advertising ideas also meet the commonly held academic definition of creativity - originality and appropriateness.

6.1 Research Method

Depth interviews were chosen as the method for the research. Such research has been used to identify elements of creativity (Hill, 1996; Lemons, 2005), but there is limited research on the creative process undertaken in advertising agencies. One difficulty in this research method is that creative personnel are being constantly evaluated and have a strong negative response toward evaluation (Vaughn, 1983; Hill, 1996).

Subsequently, the research design required a gradual process of increased commitment and familiarity between the researcher and the sample population in order to build a level of comfort and trust. This was achieved through a researcher spending a number of weeks in the work environment of the creatives, prior to depth interviews being conducted.

6.1.2 Exploratory Research – Depth Interviews

Initial interviews were conducted at a major agency's New York office. Multiple 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. A number of questions were developed with the aim of identifying how domain specific

knowledge might influence the creative processes of advertising creatives. The depth interviews were conducted during normal office hours and initial interviews were semi structured and loosely based on the following questions:

1. How do you stay creative over time?
2. Do you use any creativity techniques to assist you in the creative process, such as word associations?
3. Where have your best creative ideas come from?
4. Why do you think creatives often burn out?
5. Is there a role for structure in creativity?
6. What sort of information do you want in the advertising brief to help you develop your creative ideas?
7. Have you ever found that the creative brief contains too much information and constrains your creativity?
8. What type of testing (if any) do you think should be done on your creative ideas?
9. Do you think that the knowledge of all your past campaigns, especially the really good ones, constrain your new ideas?

The length of these interviews varied depending upon how long the creative(s) wanted to talk and whether one or two creatives were being interviewed. In all cases respondents appeared relaxed and needed only limited prompting to talk at length about their creative processes and ideas. All of the interviews except one, which was interrupted by an urgent client matter, lasted for a period of at least one hour and in the majority of cases it was the interviewer who concluded the interview so that responses could be recorded prior to information overload occurring, (on the part of the interviewer).

To make the respondents feel more comfortable these interviews were not recorded using any electronic equipment and only brief notes were taken by the researcher during the interview. Immediately after the interviews the researcher wrote up the responses. These responses were then emailed to the creatives so that they could clarify responses and ensure the researcher had accurately recorded what they had said. In addition to these depth interviews the researcher observed a number of

portfolio classes taught by senior creatives. The researcher attended at least two sessions at each portfolio class.

6.1.2 Key Findings from the Exploratory Interviews

Key findings from the depth interviews and portfolio class observations were:

1. Peer evaluation was a commonly used method of evaluation of creative ideas prior to further ad concept development. This peer evaluation went beyond the immediate creative team to include other advertising creative personnel.
2. There was an acknowledgement that, as an advertising creative, you had to be a salesperson at times and that the industry does not always support what the creatives considered their most original ideas.
3. The issue of idea evaluation was highlighted as a difficult process. In particular the new creatives, and students interviewed, appeared to have difficulties with expert based evaluation of ideas – the expert being either the creative director or the portfolio class teacher. This appeared to be due to their lack of understanding of the appropriateness criteria.
4. Discussions of the importance of deadlines and stress indicated that while creativity takes time, that time must be focused and directed. The generation of creative ideas is a highly taxing process that requires a high level of commitment and motivation, driven both internally and externally.
5. The creative team assists in the process of idea evaluation and also by providing support for the team member in what can be a high stress environment.
6. The generation of ideas in larger groups was not supported by the rewards system in the organization or the industry. Both systems tend to favour individual or two person teams.
7. Hiring of creative personnel is a problematic area as there are no good methods of determining the creative potential of individuals. Currently portfolio books are the primary basis of selection and a new creative usually goes through a period of highly stressful, low paid apprenticeship. This method ensures only highly motivated creatives are selected in agencies, but may result in highly competent creative people being dissuaded from continuing in the industry. This is compounded by the problem that new

creatives do not know the appropriateness criteria and hence they may have difficulty understanding the reasons why their ideas are rejected.

8. The motivation of creatives as they gain experience in the industry changes. Initially, there is a focus on intrinsic satisfaction based upon the development of original ideas, but as ideas are constantly rejected the creative learns the appropriateness criteria. At this stage higher salaries may be required as a factor to keep the creative in the job.
9. A variety of techniques that can be referred to as forced associative creative thinking techniques are used by creatives. They are referred to as forced associative creative thinking techniques as they force the idea generator to open thought categories that they would not otherwise have opened, by using associative words as the basis for opening that category, and in the process result in more creative responses. These techniques included; a) distant associative techniques, such as random word selection from the dictionary or language books and b) close associative techniques such as basic internet searches using words or associations from the briefing document, and looking at past campaign ideas.
10. While senior creatives teaching the portfolio classes acknowledged that there were some differences in individual creative potential, the biggest difference was time. Better students spend more time developing their ideas.
11. The creative needs to be able to sell, not just to the client but also to the creative director, the account executives, and the artists, as all of these groups can stop an idea from progressing.
12. Ideas must be developed from a customer perspective.
13. It is a young person's industry and older creatives expressed concerns over job security, and the highly stressful nature of a constantly changing industry.
14. Portfolio classes focused on evaluation of ads that were developed by the student with the focus on teaching appropriateness factors. The emphasis was on ensuring student's ad ideas were 'on strategy' and 'kept simple' - a reflection of the nature of the medium. Creative thinking techniques and the creative process were only taught at an application, not a theoretical level. This is probably because the senior creatives teaching the classes (while highly skilled at using such techniques), were not taught the theory behind these

techniques themselves. This is not surprising given the lack of consensus on the theory behind creativity that still exists even in the academic field.

15. The senior creatives teaching the portfolio classes encouraged their students to develop highly original ideas but then evaluated them verbally based upon appropriateness criteria. This is not to say they did not take in the originality of the ideas, but their verbal feedback to the class was based primarily upon appropriateness criteria.

6.2 New Zealand Depth Interviews

These initial preliminary findings were not meant to be conclusive given the small sample size and unstructured nature of the analysis. The results were used as the basis for a larger qualitative analysis undertaken in New Zealand. The following more structured set of questions was developed, and used in this larger qualitative analysis:

1. Do you normally work as an individual or with another person?
2. When working with someone else do you normally develop creative ideas individually and then discuss them with your partner, or develop those ideas with the partner immediately upon receiving the brief?

As most creatives work in teams of two, the purpose of these first two questions was to determine the timing of group discussion in idea generation sessions, either prior or subsequent to individual idea generation. This is a simple but important area of research as group interaction can have both positive and negative effects on idea generation. The use of group discussion prior to individual idea development may lead to groupthink - where people's ideas are restrained by the train of thought given by others. Alternatively, group discussion may have positive impacts, due to increases in possible either new anchor points, or alternatively new combination points, for idea generation.

3. What is the creative process you go through?

The purpose of this question was to determine if creatives used any specific techniques when undertaking the creative process. From the earlier literature research, and observation of advertising creativity, it appeared that creativity may be more a result of cognitive strategy selection (use of forced divergence techniques) than

inherent intellectual ability. A forced divergence technique is a technique that forces the respondent to use an unusual association as the basis for creative idea generation.

4. Do you think creative thinking can be taught/improved through the use of creative thinking techniques?
5. Have you had any formal creative thinking training?

These two questions were asked to determine if creatives thought that the techniques they used could be taught to others, and to determine if they had any formal training in creative thinking techniques. One of the factors highlighted in the preliminary depth interviews and portfolio class observations was that while creatives do use a variety of techniques, that can be described as forced divergent (associative thinking) techniques, each had a different version of technique that they used. Additionally, the senior creatives teaching the portfolio classes discussed what made good or bad ideas and the need for students to be highly creative, but did not teach any divergent thinking techniques themselves, (beyond simple techniques such as filling 50 boxes on a page or mind mapping their thoughts). Neither did they explain creative thinking as a process of combining divergent memory categories. Hence, it appears that while advertising creatives develop forced divergent thinking techniques through experience, they are not fully aware of how the process they go through can be used as a tool to increase creativity in others.

6. Do you have any suggestions for someone new entering the industry as a creative?

This question followed on from the previous questions as it probed respondents into thinking about any skills or abilities that may be useful for new creatives entering the industry.

7. What motivates you in your job?

The key factor driving creative output appears to be the motivation of the creative. Given that creative thinking is a highly cognitively taxing process, a strong need for internal and external motivational factors seems apparent. The purpose of this question was to determine what creatives' view as the key motivation in performing their job.

8. Why is the advertising industry so young?

This question was based upon: a) comments made by respondents in the first interview, namely that young creatives said the best time for developing creative ideas was in the late twenties, as well as, b) comments from more senior creatives that the industry favoured younger creatives.

9. What do you think of the evaluation process?

This is a central, although very broad based question which probed creatives' thoughts on the evaluation process. As originality in advertising creativity is only allowed given positive client approval, and evaluation is seen by creatives as detrimental to the development of original ideas, evaluation is an area of potential conflict and significant discussion within the industry. Moreover as mentioned in Chapter 2, appropriateness is a difficult, highly subjective, construct to measure.

10. Does your best work get to the market?

This question follows on from the previous question and was used to determine what creatives thought was their good work. Previous research by Koslow, Sasser and Riordan (2003) has shown that the perceptions of original work differ depending upon the person asked. Given that creatives state that they know when they have had the 'one right idea' it is important to find out if other people also see that idea as the 'one right idea'.

11. How do you cope with the fact that most of your creative ideas get rejected?

Finally this question was asked in order to gain further insight into the motivation of creatives and their ability to cope with an industry that appears to often have a conflict. This conflict is between the internal agency focus on maintaining large customers that want to maintain a brand position, and therefore focus on appropriateness aspects in their advertisements, while external industry award systems reward highly original material.

In addition to these eleven questions during the interview process in New Zealand it became clear that the briefing document had a critical influence on the creative process. Subsequently the following question was added to the eleven questions above.

12. How do you find the creative brief?

These questions were used in a series of structured depth interviews 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 chief executive officer, access was attained to all fourteen creatives working at the agency, both art directors and copywriters. The initial interviews followed the same process as New York with a period of familiarization, where the researcher sat in the open plan working area of the creatives, followed by the depth interviews.

As per the initial interviews these interviews were not recorded using any electronic equipment and only brief notes were taken by the researcher during the interview. Immediately after the interviews the researcher wrote up the responses. These responses were then emailed to the creatives so that they could clarify responses and ensure the researcher had accurately recorded what they had said. In addition to these depth interviews a meeting with the creative director also provided further insight into some of the responses.

The wording and sequence of the questions were varied depending upon the flow and response of the interviewees. The same interview process that was used in New York was followed in the New Zealand agency. In all twenty-six pages of transcript were attained from the interviews (refer Appendix 1).

6.2.1 Key Findings from the NZ Interviews

These interviews resulted in the following findings and research implications for each of the following sets of questions:

1. Do you normally work as an individual or with another person?
2. When working with someone else do you normally develop creative ideas individually and then discuss them with your partner or develop those ideas with the partner immediately upon receiving the brief?

6.2.1.1 Finding 1

All the teams mentioned that they develop ideas prior to discussion.

One creative team stated;

“Initially we generate our own ideas and write them down, and then we discuss those ideas with our team member”

Another team said;

“We tend to work initially as individuals. Once we have the brief we develop our ideas individually and then use each other as sounding boards once we have ideas to assess the quality of those ideas, rather than as a basis for initial idea generation”

Yet another comment was;

“We get the idea and write down our own ideas based upon the Unique Selling Proposition (USP), then discuss those ideas, and if one or other of them sees a good idea they will take it and develop it further”

6.2.1.2 Research Implications: Finding 1

The fact that creatives develop ideas individually and only then discuss them with their team member, using the team member as an evaluation tool, reinforces that originality requires creatives to develop their own initial category connections. Given that we will all make different connections from one another, this individual development of ideas leads to greater levels of originality. If ideas are discussed as a team prior to individual idea development then the range of category cues provided by the other team member would set the domain for the anchor or combination points and therefore result in a decrease in idea originality for the team. Once a person has developed their own thoughts then the discussion of those ideas in a team environment will enable the broad new range of ideas provided by the other team member to be integrated with their own domain ideas leading to possible divergent domain connections being made.

It may well be that evaluation results in decreased creativity of ideas not because it results in idea cues which are used as the basis for evaluating ideas that are generated internally, but because those cues act as either the starting, or anchor, points for idea generation, or the combination domain. This same factor may be one of the limiting factors in regards to domain specific knowledge's effect on creativity. Strong levels of

knowledge in a particular field may mean a person automatically opens particular memory categories when faced with situation cues and hence limits their ability to think divergently without the use of forced divergence techniques. Advertising creatives strong use of forced divergence techniques may be the learnt response to overcome this knowledge limitation.

6.2.1.3 Finding 2

Another advantage of a team that was mentioned by creative team was that it is easier to get over rejection of an idea when working as a team. It is not then a matter of constantly saying ‘what did I do wrong?’

“...One of the good things about working as a team is we can help each other evaluate ideas as well as providing each other with new angles. We might have an idea, which one or the other person initially does not think much of and would discard, but the other person hears it and develops it based upon a new angle. ...another advantage of a team is it is easy to get over rejection of an idea. It is not then a matter of constantly saying what I did wrong”

6.2.1.4 Research Implications: Finding 2

While this finding was only mentioned by one of the later creative teams interviewed, and therefore was not put to the other creative teams, it is a new area of potential research interest. Advertising creatives have a job that is highly stressful and contains very high levels of idea rejection. Handling that rejection is probably a major issue for creatives, and is made more difficult in that the generation of creative ideas is highly cognitively taxing and those ideas are attributed directly to a person or team and not external sources. At the same time the client may have very different views as to what constitutes a good ad for their brand and subsequently a large number of ideas will be rejected. Working as a team would lower the burden of negative self-analysis while ensuring a high degree of satisfaction and ownership of ideas that are successful. It also relates well to the fact that it is often only very senior creatives that work individually as they have achieved a level of understanding and acceptance of both their own abilities and the assessment problems inherent in the industry process. This is an area that warrants further study.

3. What is the creative process you go through?

6.2.1.5 Finding 3

All of the creatives developed ideas using some type of associative technique. Although many of them mentioned specific methods they used to assist their idea generation processes except in one case they did not articulate the method as an associative technique rather they saw it as a process they had learnt over time for increasing their creativity. The one exception was a very senior creative who had been in the industry for many decades and was able to clearly articulate the associative processes he used to increase his originality. Additionally, 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.

Common responses included;

“It starts with writing the ideas that spring to mind down. Often these are the good ideas. I will also develop mind maps on a piece of paper to develop ideas. I use techniques such as looking at award books and thinking about how those ideas were developed – not the final idea but the process, the thinking that went into getting to that idea, then I apply this to the problem I have”

“ I go through a process of generating ideas based upon the brief and the one idea, then relate that to the product i.e. telephone – related words, move down the level of association, a person using a telephone, what does a person do with a telephone etc”

“Use a variety of techniques such as scenarios. We also generate negative ideas to get them out there so we do not dwell on them and have them limit new ideas. Sky sex channel example – start with all the bad sex jokes, tissue boxes etc then what is left to work with? Go back to the problem – Need Plan B, this led us to: if you cannot score Plan B is the Sky sex channel. Important to jot down ideas to come back to. Think of different ways to approach the problem – different words”

The most senior creative in the organization wrote out a series of seven steps he uses in the creative process, of which four of the steps were related to associative or divergent thinking techniques;

*“Step 1 CREATION - DESTRUCTION
 Positive - Negative*

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.

Step 4 Take the Journey

Sit down and put in the effort to thinking about how to link the one word with the wider message. Let the mind think about those connections.

Step 5 Fill the Head with Information

Get information either from other memory categories or from external sources to assist the journey

Step 6 Think like a human

Looking at things from the customer’s perspective at different stages in the consumption process

- 1. Desires – I want*
- 2. The anticipation*
- 3. The act itself and the feelings from the act*
- 4. The after consumption satisfaction – the cigarette after sex*

Even a product I am not the consumer for I will have some knowledge on it. Tampons – the concern, the stress. We can also get information from other consumers (other people, reading books etc)”

As noted above, many of the creatives used techniques that incorporated the use of customers as the basis for creative leaps to be made;

“ One technique is to think of things from the customer’s perspective. If we are not an actual customer of that product then we go and find someone who is. Do not sit down and read about that type of person, better to talk to someone and get the experiential information from them. We use this technique often”

Another very senior creative said:

“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”

Another 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 – information on both the product and the users”

6.2.1.6 Research Implications: Finding 3

The majority of creatives mentioned creative thinking processes that were essentially forced associative or divergent thinking techniques. Whether it was: thinking as a customer, thinking down the lines of how the product is used, contemplating what the user is thinking prior and post usage, or even opening up a dictionary on a random word; all of these techniques allowed the creative to open up alternative memory categories as the basis for more creative responses. The most significant difference between the techniques used was the level of abstraction in the associative concept. It appeared that if stuck for an idea creatives will use methods based upon more abstract concepts such as random words in the dictionary or negative idea generation.

It was also apparent that advertising creatives are highly skilled in using creative thinking techniques. Indeed, 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 probably highly reliant and skilled in the use of these techniques. Over time these techniques probably use customer information as a basis for those associative connections as they will have learnt that those associations are more likely to result in acceptable advertisements.

It is not surprising that creatives use associative techniques that relate to the consumer given that advertising is only relevant if it is able to connect quickly with that customer. However, while creatives may be able to develop strong cross category links using customer based techniques, their ability to evaluate these ideas may be

limited if they are not the target audience. This may be a problem that results in clients rejecting highly original but inappropriate advertisements. This also emphasized the central importance of the role of the Creative Director in evaluating advertising ideas prior to those ideas being pitched to the client.

From the creative's perspective their evaluation of those ads will be based upon their own points of reference (refer Chapter 2) and therefore it may be difficult to understand the evaluation criteria that were used to reject the idea. It may be that these customer based insights need to be more strongly reflected in the brief. However, this will also be problematic as the creative is looking for the one central theme in the brief and too much information may itself the ability to cross memory categories by setting the anchor points for idea generation. Subsequently, setting the problem definition too rigidly in the creative brief may limit divergent thinking.

4. Do you think creative thinking can be taught/improved? through training, creative thinking techniques

6.2.1.7 Finding 4

The appropriateness part was seen by creatives as teachable but not the making of the creative leaps, the originality. As stated;

“What makes a good ad maybe. One of the things I remember being said by a senior creative when I was new, was; ‘we will both have the same number of ideas I will know which are the good ones and you will not’.

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

and,

“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. 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”

One creative discussed the influence of their schooling and how they were taught to think,

“The schooling systems had a large influence on my current jobs. A primary school that supported creativity and treated us as people not children. I did not fit into the rigid structure of the corporate world – the personal assistant that has to spell every word correctly”

6.2.1.8 Research Implications: Finding 4

Research (Clapham, 1997; Tanner, 2001; Scott, Leritz, & Mumford, 2004) illustrates that creative thinking techniques can be taught and will result in more creative ideas, although the starting point for those leaps will be different for different people. Creative people may have better associative abilities and be more able to make connections between distant associations/ideas (Mednick, 1968). Despite this however, the premise that original idea generation cannot be taught appears to be a commonly held belief. To some extent this is correct in that a creative individual may be more able to make remote associations than others and therefore their divergent thinking process will result in more original ideas being generated. However, it may also be that creative thinking techniques can be taught and greatly improve the creative performance of most people.

5. Have you had any formal creative thinking training

6.2.1.9 Finding 5

The majority of the creatives had training, but it was structured training i.e. how to develop appropriate ads, not creative thinking techniques used to develop an understanding of the creative process.

One creative stated;

“I did not learn any creative thinking techniques, I did not have formal training. Did the courses, what an advertising executive does, what a creative does, what is advertising etc, but the creative thinking course was very basic – write down your ideas straight away, put six boxes on a page and develop six different ads. If I were asked to do that these days I would put down three boxes as I knows three of them would not be accepted”

Another response was;

“One or two months of training. Just learnt the structure – i.e. what is a brief etc. Did not learn creative thinking techniques. Do not think that schools are as effective as on the job training. Better to come and work for a good advertising agency for nothing for a year rather than pay high tuition fees on a school based programme. Too much knowledge of an area in itself limits creativity”

and;

“Yes, did a course, very intensive, 9-5 taught how to handle deadlines, briefing documents, some basic creative thinking techniques, visited agencies”

6.2.1.10 Research Implications: Finding 5

There is a need to see if any schools teach creative thinking theory effectively.

6. Do you have any suggestions for people entering the industry?

6.2.1.11 Finding 6

A common theme here was that new creatives should use mentors and get involved in the industry as quickly as possible. It appears that there is an acknowledgement that there are skills and techniques to be learnt. Respondents also placed a lot of emphasis on the ability of new creatives to overcome rejection and realize the limitations of the industry. As stated;

“Do not get frustrated. You learn ways of doing things, but it takes time. I have 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. It is a way of thinking that took a while to get into. You learn better ways/techniques for doing things over time”

and;

Have to be willing to accept rejection. Need to work in an agency but it must be the right agency – influence and emphasis on allowing good creative ideas to get through.

Another creative suggested new creatives should;

“Get a book and look at a person’s ideas and copy the techniques and they will become your own. Come in before everyone else and work after everyone

else has gone. Get a mentor. Be passionate. The people who are not passionate do not make it”

Another junior creative said;

“You must be enthusiastic and enjoy your work as it does not pay well. Use the senior creatives. There are a lot of great helpful people here (in the agency) that do not mind helping. Many of the new young creatives protect their ideas when they come in as if someone wants to steal them, but they should discuss ideas and ask the senior people. The creative director is helpful but does not have the time to mother the new creatives. The senior creatives know which ideas are the good ideas, whereas I am still relatively new and still do not have a strong opinion on a lot of creative ideas. I will have plenty of ideas but do not have the same skill in determining which are the best ones that will make it. I and my team partner will develop fifty ideas on each concept and the creative director might look at one hundred of our ideas and choose just one (if they are lucky) that goes through to the client, and the client may still not accept that idea”

6.2.1.12 Research Implications: Finding 6

It may well be in the advertising industry that the biggest hurdle for new creatives to overcome is their lack of knowledge of the appropriateness criteria. New creatives appear to spend a lot of their time searching for structure and a basis for determining what the creative director and clients will evaluate as a good idea. A statement by senior creatives is that junior creatives will have the same number of ideas but the junior creatives will not know which are the good ideas.

For junior creatives the lack of knowledge of the appropriateness criteria may mean they develop very novel ideas but they do not know how to either adapt or present the idea as something that the client will accept. Not knowing the appropriateness criteria may then result in a lack of the development of their own creative ideas and more repetition of existing ideas as they search for appropriateness in award books.

At the same time the problem for more experienced creatives is that they must ensure they do not become too focused on client requirements and concepts that they know

have worked in the past, otherwise they will become stale and provide appropriate ideas that lack originality. A comment was that the industry requires a lot of new ideas and they must be careful not to become dependent upon what they have done in the past or they will become stale.

7. What motivates you in your job?

6.2.1.13 Finding 7

Both intrinsic and extrinsic factors appear to motivate the creative. Recognition by people in their social group as well as awards is important. However, a number of creatives also pursue external means of attaining creative recognition and satisfaction. This may reflect the problem in that their big C work is not recognized due to the issues of evaluative criteria that emphasize appropriateness. Intrinsic motivation is therefore low meaning external avenues are required if they want to express their more creative work. Another interesting point is that large clients provide the time and financial resources that should lead to big C creativity but then emphasize risk aversion and appropriateness criteria to maintain their existing brand position. This means the big clients are often not accepting of highly original work. As stated,

“We could develop very creative stuff for the established client if they let us”

“The least creative work is often done for the big client who knows what they want and pays you to do what they want. The most creative work is for the small client who does not have the money and is therefore happy with whatever you give them. This allows for creative freedom”

“... also there is the concern and attention given to the big client who is often not pushing for highly creative material”

In regards to what motivated them, one team mentioned,

“The awards. Having great ads recognized. The advertising industry is great as when you do something great, people know it and recognize it”

A very junior creative said;

“I enjoy the job. You get to develop ideas and there is both internal and external satisfaction from this, but you need to get the internal satisfaction as you might develop one hundred ideas and the creative director might just select one of those which is then rejected by the client. I know people who work at the other major Agency in town from nine until ten o’clock or midnight. Here it is not so bad although you are still often thinking about an idea after work – still working.

Awards are a good motivator but they come only once a year”

6.2.1.14 Research Implications: Finding 7

There is a need to look at the reward system in agencies. There is a high level of idea rejection that is not due to individual creative inability but more related to client factors. This can not itself be changed, as creatives need to quickly learn what clients like and do not like, however good work could be recognized more strongly within the agency. While this is already done to some extent with good ads being put up around the office, a big motivational issue is the external recognition that a great ad achieves, which could potentially be enhanced through greater publicity of the creative teams behind good advertisements.

8. Why is the advertising industry so young?

6.2.1.15 Finding 8

Stress seems to be a big factor for creatives. For less senior creatives money appears to still be a central motivating factor, but the need for constant change leads to high stress levels and therefore money is only a hygiene factor and may not last as a strong motivator. One long comment from a creative was;

“It is a high stress industry you have the extremes of highs and lows. Some days are great, other days you want to quit. Once a month I feel liking giving it all up and doing a lower stress job, but this passes. Good potential for high income earning (four years of hard work and you can earn what a doctor earns). The people we looked up to in the field are all gone however – retired to other occupations or businesses. Used to be able to earn better money in the industry, seems to be a bit tight at the moment in the NZ industry”

Other comments in related to stress levels;

“It was not as young in the past. Fresh faces, fresh ideas maybe. Sure it maybe some ideas do not make it out there but you have to enjoy your job. If I did not I would just leave. If you needed to get your creative buzz elsewhere then you might as well just leave. It is a stressful job, there is pressure all the time”

“Do not get frustrated. You learn ways of doing things, but it takes time. I need to have 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. It is a way of thinking that took a while to get into. You learn better ways/techniques for doing things over time”

In relation to job stress, the rejection of ideas was again mentioned,

“Have to be willing to accept rejection. Need to work in an agency but it must be the right agency – influence and emphasis on allowing good creative ideas to get through”

6.2.1.16 Research Implications: Finding 8

Advertising is a difficult field especially for the creative as the agency asks creatives to be original but then the majority of their ideas will be rejected when their originality does not relate directly to what the client says they want. Given that originality may be reduced if appropriateness criteria are known prior to idea generation, it is a difficult process for the creative. A brief that provides too much information on the appropriateness criteria will reduce originality by providing too many common anchor points that limit the divergence of cross memory combinations. However, without this appropriateness criteria many of the ideas that are generated will not be suitable. This leads to the importance of creative thinking techniques.

Divergent thinking techniques allow creatives to have some knowledge of appropriateness criteria but still move to distant memory categories in order to achieve originality. The use of these techniques will develop over time. A person may have strong knowledge of the techniques and an inherent creative ability, but without years of practice they will not be able to generate the same quantity and divergent quality of ideas.

9. How do you find the evaluation process?

6.2.1.17 Finding 9

There were no positive responses toward copy testing methods. Due to the limited number of copy testing options available in NZ, it appears that focus groups are the most common method that creatives come across as a pre-test copy measure. There was a common contention that testing leads to less original material and stops good work. Frustration was indicated that clients often appear not to understand the creative process, or even the limits of what advertising can and cannot do. Common comments in relation to testing included;

*“It has its role – if it supports your idea then it is great if not then it is not good.
Generally not a good thing”*

“There are award books. Difficult to evaluate creativity”

“Evaluation – when people evaluate an idea and the idea is a good idea they know it in their gut. They do not need a test to know this. However, when testing does occur it often kills the idea as it does not fit nicely into those limited testing measures. Testing and research is a negative”

“No such thing as a good research. Evaluation should be done by the client, the person who has the authority to make the decision on whether the ad should run or not. Research is used by some clients as a means to protect them, especially if the brand manager does not have the confidence to make the decision. Good brand managers/clients have some things they are looking for in an ad but are able to make the decisions themselves without using research tools. Example – the current McDonald’s brain ads would not have made it through testing”

“Like most creatives I will say this – I do not like evaluation. Been in a focus group and everyone feels like they have to say something to criticize it. Also you get a loudmouth and they talk loudly and everyone follows that person’s lead”

Most creatives had a lot to say about the evaluation process, one particularly lengthy response stated;

“We are doing evaluation all the time. From when we first start to generate ideas and bounce them off each other, evaluation is happening – through to the other creative teams and the creative director evaluating the ads. However pre-tests and other quantitative measures are not good. How can a carton representation of an ad with a voiceover reflect the consumer response to a final product. Kid asks – ‘is it all a carton?’. Also you get artificial levels of attention in these tests. It is not like looking at a TV ad at home. You also get groupthink – one person likes it so they will say they do. Often simpler version of an ad will research/test better – Company X example – made one ad –client asked for a second execution with very little time – developed a simpler version – it tested well. Client went with it and it was not successful.

It is frustrating when the client does not understand the process. Example client meeting with brainstorming notes on the wall that had been developed extensively with many teams and sessions. Client says– ‘oh lets just work further and develop with these ideas’, as if they were ideas done in half an hour.

We could develop very creative stuff for the established client if they let them. The client needs to understand the creative process as well. The suit often does not understand the creative process. Selection of a good suit is an area that needs looking at”

6.2.1.18 Research Implications: Finding 9

The problem with evaluation may be due to how tests change people’s responses under test conditions, or it could be less to do with the evaluation per se, and more to do with the inadequacies with the testing methods available in NZ.

Creatives and clients both have the problem of needing some sort of evaluation prior to the very expensive process of full ad production and media purchase, however there is limited access to good testing methods in NZ. This results in the perception from creatives that the most reliable method for evaluating creative ideas is evaluation by experienced creative directors or brand managers. Given an ever-changing market

and differences between the evaluation criteria of creative directors and brand managers and the market, as well as problems with inexperienced, risk adverse, brand managers, it may be of significant value if there were better testing methods available in the NZ market.

Alternatively tests may result in less creative work as respondents are more likely to provide responses that fit into the criteria that they feel will succeed in the test. The creative director is able to use a broader base of criteria in evaluating ideas and hence the respondent feels more confident providing more original, less structured responses. It would be expected that increases in certain evaluation criteria, or anchor points, will increase appropriateness but decrease originality. A test is also needed to see if providing evaluation criteria destroys the originality of responses.

10. Does your best work get to the market?

6.2.1.19 Finding 10

There was a mixed responses from respondents to this question. Most said that their best ideas did not make it to market and were stored in their bottom draw awaiting future opportunities. Some said that sometimes their best work did make it to market, but qualified this by saying that this work must tie in with what the client wants and the limitations of the advertising medium itself - where consumers can only take in so much information at any one time. Awareness of the requirements of the industry may lead to creatives accepting and attuning themselves to meet appropriateness criteria at the expense of originality. It may also result in the need many have for external avenues of creative expression. Comments included,

“No, there are a number of ideas sitting in the bottom draw waiting to be used”,

“Some of it yes”,

“Sometimes, not often”

and,

“No, a lot of their ideas are watered down. The idea may be watered down to such an extent that she does not want to acknowledge it anymore. ‘Is that your ad?’ ‘No’”

6.2.1.20 Research Implications: Finding 10

A larger study could be conducted to see when creatives learn the limitations of the industry and at what stage they accept those limitations. There may also be a correlation between this realization and the level of involvement in external methods of creative expression, such as art or writing. This result was also interesting in that it appears to contradict Amabile’s (1986) contention that creative ideas are universally recognized, at least in the area of advertising creativity.

11. How do you cope with the fact that most of your creative ideas get rejected?

6.2.1.21 Finding 11

None of the creatives found the rejection process easy. However some stated that it was made easier by having two person teams.

“Not easy – having two people helps, as you half the credit but can also give them half the blame. The creative director does not give a lot of encouragement. Senior creatives work alone because they know what is a good idea, they can focus on it and do not have to listen to others”

and

“It is a roller coaster – you can have a good idea accepted and be on a real high one moment and the same day a great idea is rejected and you are on a real low. They can handle the rejection as they know they have had so many good ideas already it is not them. It is others rejecting good ideas”

6.2.1.22 Research Implications: Finding 11

As per the discussion from questions one and two.

12. How do you find the creative brief

6.2.1.23 Finding 12

One of the common issues mentioned was that the client often wants to put far more material in an advertisement than will be taken in by consumers, and this is reflected in long briefing documents. A number of comments eluded to this problem including;

“Usually it is not a great (well written) document. They condense it down to the key word/concept/the unique selling proposition. Usually the suit does not think like a creative”

“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”

“Sometimes the brief is 2-3 pages, they need to narrow it down to the key issue/word”

“Sometimes the target market information is correct which helps. The suit needs to better understand the creative process. The suit and the client often want too much information in the ad and need to get it down to the one key unique selling advantage. The tone is also useful – the tone being the client type, what will they accept – conservative vs. willing to try something new”

6.2.1.24 Research Implications: Finding 12

The client seems to either not know, or forget, that the level of the attention of the audience towards ads is generally very low and this means that only limited stimuli will be comprehended. When the client views ad copy they are essentially seeing an ad in an artificial setting, paying too much attention to it, and have a predisposition bias toward the ad stimuli. They also have extensive knowledge of the product category/brand/message, meaning that they are able to process the ad information using much less cognitive capacity than a target consumer.

6.2.1.25 Finding 13

Statements such as “It is important not to get too structured as a creative” and “The brief needs new angles” were common. All creatives mentioned that the briefing documents were too long and needed to focus in on the unique selling proposition. They also mentioned that this USP must be unique, comments included;

“Sometimes if they have some insight there it can help – had a tonker toy insight they used as the basis for an ad – father’s wanted their sons to play with something tough not like dolls, that insight was useful”

“It would be useful to know the client better. Some clients you can discuss the idea with them, get them to see your point of view”

6.2.1.26 Research Implications: Finding 13

These findings point toward the importance of the briefing document. The brief is often the first piece of information the creatives receive and the information in the brief might trigger domain specific knowledge that then acts as the anchor points for 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 appear unique to the majority of the target audience. Subsequently, as the brief provides the cues to domain specific knowledge that then provides the starting point from which initial jumps/associations are made, too much information in the brief may limit the originality of ideas. However, if advertising creatives have knowledge of creative thinking techniques that may then allow them to overcome any anchor point limits imposed by information from the creative brief. Subsequently, the effect of detailed briefing documents is unclear.

In addition, the lack of knowledge by the creatives of evaluation criteria will result in ideas being presented to clients which clients will reject as highly original but inappropriate advertisements. From the creative’s perspective their evaluation of those ads will be based upon their own points of reference and therefore it may be difficult to understand the evaluation criteria that were used to reject the idea. It might be that these customer based insights need to be more strongly reflected in the brief. However, this might also be problematic as too much information in the brief might lead to anchor points that reduce originality.

At some stage evaluative criteria will be used in judging ideas and hence creatives will need this information. Therefore the question of when appropriateness criteria are introduced in the creative process is critical. It is hypothesized that limited information should be provided prior to the initial generation of ideas, but after the creatives have opened their own unique memory categories, evaluative criteria should be introduced so that the creatives can then bring those ideas back onto strategy and meet client requirements. This could be tested using different briefs to determine the

effect of the amount and type of briefing information on the originality and appropriateness of ideas.

6.3 Key Implications of the NZ Depth Interviews;

1. Too much information in the brief limits creativity as it sets cues and hence limits the starting point for divergent thinking. Originality must occur prior to appropriateness informational cues being presented.
2. Brief design is important and research is needed to determine at what stage the following information will assist in the creative process,
 - a. Consumer insight
 - b. Client tone
 - c. Product information
3. All creatives work in styles that are consistent with creative thinking techniques although they may not be aware of it. Most of these techniques result in close associative leaps based upon product and user information.
4. Social recognition was a central motivating factor as well as peer recognition through awards. However, there may be differences between junior and more senior creatives in regards to motivational factors with junior creatives more focused on awards. Peer recognition is the central motivating factor amongst creatives although this may vary depending upon level of seniority.
5. Clients in NZ rely on focus groups (given limited choice), which are an ineffective test for what they are trying to measure.
6. The best creative work does not make it to market.
7. Clients with established brands tend to be less focused on originality. Originality is needed for ad agency reputation/creative awards(motivation), leading to the need for the agency to maintain a mix of large established accounts and new accounts

6.4 Summary of Findings from the US and NZ Depth Interviews.

Overall findings developed through an analysis of the qualitative analysis of both New York and New Zealand agencies were;

1. The creatives undertake idea generation individually and then used their team member as a basis for idea evaluation and development.

2. Creatives use a peer evaluation system. One of the critical roles of their team member is to evaluate ideas so that bad ideas can be quickly discarded. Creatives accept the evaluation of other creatives and realize that they need this evaluation as it is difficult for them to evaluate their own ideas accurately. They also recognized the need for a mechanism for discarding bad ideas quickly.
3. Creatives do not think quantitative evaluation of advertisements is effective. They felt that if creative ideas are evaluated prior to execution, those ideas have little chance of being made into advertisements. Most felt that great ads are made when a client has the authority to make a decision based upon their own experienced based feeling.
4. Developing creative ideas requires a broad basis of starting points. It may be that forced divergence or associative techniques are used as a method to generate ideas and overcome creative blocks.
5. All creatives appeared to use some type of associative divergent thinking technique (such as variations on word in the USP in the brief) as the basis for idea generation. However, some used techniques based upon close associations that would provide moderately original but highly appropriate ideas, while others used more distant associative techniques.
6. All the creatives identified that they needed to be more than merely generators of good ideas, they also had to develop a salesperson's role. Creatives need to be able to sell their ideas to a range of people including the client, the creative director and the account people.
7. The evaluation of creative ideas is problematic. While creatives have their own strong opinions on the creativity of their own ideas they also stated that it is important to put forward a range of ideas as ideas that they may not have evaluated positively themselves may be evaluated strongly by others.
8. Time pressures were seen as both positive and negative. Creatives needed time pressures to motivate them to work on a project but too little time led to stresses that limited their creativity. It appears deadlines are needed to ensure creatives give the time needed to move down a stream of creative thoughts far enough to have something that is original, but at the same time without deadlines there is a lack of motivation to do the difficult cognitive processing required for creativity. Creativity takes time, not undirected time but focused

directed time followed by periods of less directed time. It would appear that creative ideas do not spring out of the air but are a result of a concerted effort.

9. The structure of the reward systems encourages small teams and the development of ideas individually. While group idea generation approaches are often used, they require the creative director to be there to encourage the ideas and act as the judge.
10. Experienced creatives are able to accept that their creative ideas will often be rejected. Experienced creatives motivation comes from monetary rewards not through creative expression of ideas. It appears that one of the reasons the industry is so young is that creatives do not feel they are able to express themselves creatively as their ideas are constantly being rejected. For many it seemed it has become “just a job”. It is also a high stress profession with constant extremes of highs and lows.
11. Portfolio classes encouraged students to come up with highly original advertisements, but then assessed those ideas based upon their ability to quickly communicate a message and their appropriateness to the briefing information.

6.5 Conclusions

It may well be that too much information in the briefing document results in decreased creativity of ideas because it results in idea cues which are used as the starting, or anchor, points for idea generation. This same factor may be one of the limiting factors in regards to domain specific knowledge’s effect on creativity. Strong levels of knowledge in a particular field may mean a person automatically opens particular memory categories when faced with situation cues and hence limits their ability to think divergently without the use of forced divergence techniques.

Advertising creatives’ strong use of forced divergence techniques may be the learned response to overcome this knowledge limitation.

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 provides the cues that trigger domain specific knowledge that then acts as 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 may 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 appeared to welcome briefing information that provided a unique starting point. Too much information on the target market, the product or common selling propositions lead to a negative perception of the brief. This supports the contention that the briefing document cues domains specific knowledge that then acts as the starting, or anchor point, from which ideas are generated and affects the creative outcomes.

These findings are summarized as follows:

1. All creatives appear to use forced associative creative thinking techniques – most relate to close associative leaps, and product and user information
2. Too much information in the brief limits creativity because it cues domain specific knowledge and hence limits the starting point for divergent thinking.
3. Developing creative ideas requires a broad basis of starting points. The use of forced associative techniques appears to be the method used by creatives 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, informational cues and domain

specific knowledge are significant influences on creative outcomes. To this end a research instrument was designed and pre-tested, this is the focus of the next chapter.

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7.0 Research in Advertising Agencies

While there is a growing body of research on creativity in a variety of settings, there is still relatively limited research on the creative process being undertaken inside advertising agencies. Advertising agencies are a good place in which to study creativity as agencies employ personnel solely for the purpose of developing creative ideas – original and appropriate advertisements. The major constraint when undertaking experimental research in an advertising agency is the significant time requirements required by both the researcher and agency personnel. It is especially difficult to get access to creative personnel, as successful advertising creatives are extremely valuable commodities and are protected by their creative directors. Hence, it is critical that any experimental instrument developed for use on creative personnel is first pre-tested to ensure it accurately tests the variables under analysis.

7.1 Experiment Design Objectives

The aim of the pre-test was to develop and improve the effectiveness of a research instrument to test the effect of domain specific knowledge and creative thinking techniques on creativity. Additionally, this test should indicate if there are differences in individual creative output on a range of measures. These measures can then be combined with other measures to act as the basis for identifying individual creative ability.

7.2 Method – Pre-Test

A group of students from a University of Waikato marketing research undergraduate course were asked to undertake the pre-test experiment. Examples of the response booklet, information for respondents, instructions and ethical approval forms are shown in Appendices 2-5. The pre-test used a two by two full factorial design. Two treatments were manipulated resulting in four different conditions.

Table 7.1: Pre-test Experimental Design Matrix

Treatments	<i>Forced Divergence Technique</i>	<i>No Technique</i>
<i>High DSK</i>	Condition 1	Condition 2
<i>Low DSK</i>	Condition 3	Condition 4

The two treatments were the level of domain specific knowledge, and the use of a forced divergence creative thinking technique.

7.2.1 Treatment One – Domain Specific Knowledge

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). Domain-specific knowledge is comprised of structured and related memory categories that assist people to solve problems and make decisions quickly in relation to a particular area of analysis. All knowledge is connected in some way; however the concept of a domain may be best described as a continuum of related concepts, with some information more closely related than other information. All people learn and built-up thought categories, or domain knowledge, over time to assist in interpreting situations and as the starting points for idea generation. Findings from the qualitative analysis (refer Chapter 6) indicate that information in the briefing document used in advertising agencies, influences the idea generation stage of the creative thinking process by cuing domain specific knowledge that then sets the anchor points from which new ideas are developed. One of the aims of the research instrument was to quantitatively test this contention.

In the research instrument the influence of domain specific knowledge was manipulated through the use of instructions provided for participants on the first page of the response booklet. This first page emulated a briefing document in that it contained common briefing information including: the product type, the competitive strategy, and target market information. In the pre-test, domain specific knowledge was manipulated through information on the competitive strategy: conditions one and

two provided instructions that used a common, well-known competitive strategy for the product category, while conditions three and four used a new, unique, competitive strategy.

In conditions one and two participants would have significant past exposure to product advertisements using the same competitive strategy and hence their domain specific knowledge would be relatively high. In conditions three and four participants would have no previous exposure to this competitive strategy and hence possess relatively low levels of domain specific knowledge. The second treatment manipulated the second factor under analysis; the influence of creative thinking techniques on creative outcomes.

7.2.2 Treatment Two – Forced Divergence Techniques

There are a large number of creative thinking techniques available to the practitioner (McFadzean, 2000; Tanner, 2001). Most of these techniques relate to the widely accepted creative thinking process of divergent thinking (Guilford, 1967; Schoenfeldt & Jansen, 1997). These creative thinking techniques can also be related to the four stage model of creative thinking introduced in chapter 2. Most of the techniques increase the originality of responses through providing prompts that force the respondent to use unusual or distant anchor points from dissimilar domains to redefine the problem or as divergent combination points for the generation of ideas.

The qualitative research found that creative personnel in advertising agencies all used creative thinking techniques. These techniques allowed the creative to develop more original responses and overcome the limit of domain specific knowledge resulting in habitual or similar domain based responses. All of the creative personnel used techniques that provided new or divergent starting points for the recombination and reorganization processes used in creative thinking (Mumford, Whetzel, Reiter-Palmon, 1997).

However, there were some differences in the degree to which the techniques used by creative personnel was based upon a close or distant associative cue, and hence forced a more similar or distant domain of knowledge to be used as the basis for new idea generation. Some creatives used techniques that resulted in similar domain knowledge being used; such as product or consumer based techniques, while others used techniques that resulted in highly divergent domain knowledge being accessed; such as the use of random words from a dictionary or using extreme opposite ideas (refer Chapter 6). It may be that knowledge and expertise in the use of either similar or distant forced divergence cognitive strategies relates to Mednick's (1962) theory of remote associative ability. Indeed, the further study of Mednick's theory, conducted by Coney and Serna (1995), used words with different levels of associative ability; low, medium and high, to try to measure a person's associative abilities.

To test the influence of creative thinking techniques on creative output and to try to determine their relative importance in the creative thinking process, forced divergence techniques were used in the instrument and the level of association was varied across the response booklets. In the pre-test conditions one and three, instructions were provided for the use of a forced divergence technique, while in conditions two and four they were not provided. The words used as the basis in the forced divergent technique instructions were frog, stone and winter. These words were selected based upon data from Nelson, McEvoy and Schreiber (2004), with frog being the word with the strongest association with the product category used in the experiment (fly spray), and stone and winter being words with increasingly less association. The order of the words that were used as part of the forced divergence technique was randomized to remove order effects.

Additionally, given that everyone develops their own unique connections and associations between their category memories, it was anticipated that there may be different individual perceptions by respondents as to the level of association of the three words used in the forced divergence technique treatment. Therefore, to test the degree of perceived association between the words used in the forced divergence conditions a manipulation check was undertaken as part of a self-assessment rating.

7.2.3 Participants

The study was a between subjects design with random allocation of subjects to the various conditions. Sixty-six 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 thirty-five percent were male and sixty-five percent were female students. Participants were unaware of the different conditions under study and were allocated to one of the four conditions by the response booklet that they received, resulting in eighteen, seventeen, sixteen and fifteen respondents in each of the four conditions respectively. 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 advertising concepts.

7.2.4 Materials

A response booklet was developed, (refer Appendix 2) in which instructions were used to manipulate the two treatments resulting in the following four conditions:

1. Domain Specific Knowledge and Forced Divergence Technique
2. Domain Specific Knowledge and No Forced Divergence Technique
3. No Domain Specific Knowledge and Forced Divergence Technique
4. No Domain Specific Knowledge and No Forced Divergence Technique

7.2.5 Instructions

Instructions on the front page of the response booklet asked respondents to develop a set of creative ideas and then select the best idea from their list to develop further into an advertisement. Participants were told that this process was to be repeated three times and then they were to fill in a short self-assessment form. In all respondents were asked to develop three sets of creative ideas and three individual advertising concepts; as well as fill in a short self-assessment form within the one hour period. The creative task was similar to a creative task used by Mumford, Baughman, Maher,

Costanza & Supinski (1997), where respondents were required to develop a television advertisement for a new product. The time frame of one hour was considered a relatively short period of time to develop three sets of ideas and concepts, but this was weighed against the need to avoid participant fatigue and provide adequate data for analysis.

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.

The fly spray's competitive advantage is that it is extremely rapid 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.

The fly spray's competitive advantage is that the chemical contents break down after they come in contact with air, within a period of 30 minutes leaving no harmful chemical residuals.

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 instructions to use a forced divergence creative thinking technique when developing their creative ideas. In conditions one and three respondents were told to use a key word to assist them in generating their creative ideas.

When developing your creative advertising idea please use the key word provided on the cover page for each concept to help you to develop your ideas. For a non-advertising example, if I were asked to 'develop creative uses for a brick?' and the key word was 'WATER', the ideas that come to mind might be;

- 1. use it to splash a person who was walking past a lake*
- 2. use it on a wet path to keep my feet dry*
- 3. use it to dam up a very small stream*

4. *use it to plug a hole in a dam*

In conditions two and four participants had to generate creative ideas, and three separate advertisements, without the assistance of these words.

When developing your creative advertising idea please generate and record as many different creative ideas as possible on the cover page. As a non-advertising example, if I were asked to ‘develop creative uses for a brick,’ the ideas that come to mind might be:

1. *use it to smash a window*
2. *use it to smash a glass table*
3. *use it to prop up a leaning table*
4. *use it to block up a very small window*

Three different key words were used for each of the three advertisements that respondents were asked to develop in conditions one 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 as part of a self-assessment rating measure.

7.2.6 Procedure

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. In addition participants were told that they were not to put their name on the response booklet as the researchers were not looking at individual responses but comparisons between sample populations. These last two instructions were used to remove evaluation concerns and minimize expression limitations. 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 provided. When listing creative ideas respondents were told they could do so either pictorially or using the written word.

After respondents had completed the three advertising generation tasks respondents were required to complete the final two pages of the response booklet, which contained a self-assessment rating questionnaire. This questionnaire also contained classification and post test manipulation questions.

Given participation was voluntary, control conditions were not optimal. The pre-test was undertaken during normal class hours during the second half of a two hour session. 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 answered their questionnaire. However 15 of the respondents did not answer the self-assessment form at the end of the instruction booklet. This resulted in 17, 17, 16 and 15 fully completed response booklets in conditions one to four respectively. Instructions for the session were provided to students by the researchers.

7.2.7 Measures

The effects of the two treatment factors were assessed by two methods. Firstly respondents filled out a self-assessment form on the final two pages of the booklet (refer appendix 7). This self-assessment form contained six, seven-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 advertisements they had seen on ten 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 to complete the manipulation check question to assess their perceived 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. This final measure has the limitation of individual subjectivity, but was deemed adequate given that the experiment was a pre-test.

7.3 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. Eleven variables loaded onto those two factors with loading of at least 0.65 and the two factors accounted for more than 60% of the variance explained.

Table 7.2: Rotated Factor Analysis - Oblimin Rotation

	Factor 1 – Originality	Factor 2 – Appropriateness
Imaginative	0.65	0.38
Unexpected	0.86	0.06
Novel	0.78	0.16
Different	0.71	0.22
Appropriate Strategy	0.15	0.78
Benefit Target Market	0.29	0.77
Effective	0.38	0.78
On Strategy	0.19	0.75
Strategic Fit	0.19	0.80
Appropriate Strategy for Client	0.24	0.76
Built on Good Strategy	0.16	0.71

Analysis of variance was undertaken on the means of each of the seventeen individual likert measures as well as the number of creative responses generated, in order to compare the results of the four conditions. Of these seventeen measures, seven

showed significance ($p < 0.05$.) across the four conditions. While there were small differences between the means, indicating a positive relationship between the use of forced divergence techniques and the number of creative ideas generated, the most significant finding was that there appeared to be a negative self-assessment bias when respondents were told to use the forced divergence technique. Respondents appeared to rate their responses lower on the factors that loaded onto the appropriateness measure when they were required to use key words to generate their creative ideas - the forced divergent treatment. However, the very small sample size and limitations in the pre-test research instrument means that not too much can be read into these results and subsequently they are not recorded here. However these results do provide a basis for further analysis.

Additionally, 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 third party evaluations to verify the self-assessment methods, but given the high cost of doing so, this was determined as beyond the requirement of this initial pre-test. While the factor analysis suggests that the instrument provides a good method to test the two constructs under study; originality and appropriateness, a number of improvements were made to the research instrument.

7.4 Instrument Development

The results of the pre-test were used primarily to assess the research instrument and procedure. A number of limitations were found for use in the improvement of the subsequent data collection instrument.

1. The voluntary nature of the test and the small sample size meant that optimal design and control conditions were not able to be achieved and there appeared to be a fatigue factor resulting in a drop in response in relation to the third advertisement that was generated. Given the highly taxing nature of creativity tasks (Ward, Patterson, Sifonis, Dodds & Saunders 2002), it is not surprising that some students found the task mentally difficult. This led to more stringent instructions in regards to spending the entire time allocation for each

of the three concepts generated in subsequent research. Subsequently, prior to conducting the experiment respondents were told to spend the entire 20 minutes on the first of the advertising concepts and not to move onto developing the next advertisement until the entire 20 minute period was complete.

2. The class was made up of a combination of domestic and international students, and the creativity task appeared to be significantly more difficult for students where English was a second language. Subsequent research added a post-test question to determine student's first language. The student sample was then split into two groups: students with English as a first language, and students with English as a second language.
3. In the treatment where a forced divergent technique was not used some students appeared to only make one list for the initial advertisement section and developed ideas from this list for the second and third advertisement sections rather than generating entirely new lists of ideas. It was unclear whether this was due to a lack of ability in respondents in developing new ideas, or a lack of clarity in regards to the instructions. This led to an improvement in the instructions used in subsequent research. Overall the instructions provided were made more concise, while headings and instructions emphasised that each of the three advertisements required an entirely new set of creative ideas to be developed. Additionally, verbal instructions were added prior to participants starting the experiment informing respondents to develop three separate sets of advertising ideas.
4. The researcher noted that the use of the same three key words across all instances of the forced divergent technique treatment would mean that judging creative ideas as original in relation to the forced divergent technique treatment and the non-forced divergent technique treatments would be difficult. Given that the experiment proper was to use judges blind to the experimental conditions to evaluate the advertising concepts on their degree of originality and appropriateness, the use of the same key words would mean that they would be seeing similar ideas numerous times and hence would be likely to evaluate those ideas as relatively less original than ideas generated in the non-divergent technique conditions where no key words were provided.

Subsequent research therefore used different key words selected from a list of 30 sets of words (refer Appendix 8)

5. One hour appeared adequate time for participants to complete the required tasks with a number of participants completing the entire process within the time.

Despite these limitations the instrument appeared to be relatively robust and with the changes made could be used as the basis for empirically testing the findings from the literature and qualitative analyses. The improvements were incorporated in the development of the final research instrument (refer Appendix 9).

7.5 Areas for Further Research

As mentioned in the summary or results section, there appears to be a negative assessment bias when respondents used a creative thinking technique. This was an unexpected result, but can be explained by the fact that respondents might think that the use of techniques results in a more structured, less creative, response. However, the effect of the technique and its forced associative cues should result in more original ideas. Further research in this area is needed as if this negative self assessment bias is proven it means that respondents might reject their own ideas when using creative thinking techniques, when in fact those ideas may be more creative.

While the qualitative analysis showed strong support for the propositions from the literature, a more detailed study on a larger sample group is required to quantitatively support those propositions. Additionally, independent judging of responses, by judges blind to the experimental conditions is needed to provide validity for the effects of both creative thinking techniques and domain specific knowledge. The next chapter discusses the methodology for the quantitative analysis undertaken using the improved research instrument developed from the pre-test.

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8.0 Background

What is apparent from the previous research is that when developing creative ideas we use some form of existing information as a starting point and then add other memories, or information from the environment, to that idea to generate new solutions. The more remote the domain that the new, or the initial idea comes from, relative to the standard societal response, the more original the new idea combination. Hence the importance of: a) situational information and the domain specific knowledge that is primed by it and, b) the deliberate use of divergent thinking creativity techniques that allow us to cross over into more distant domains to either reframe the question, or to find a solution.

The findings from the qualitative analysis highlight these issues in an industry setting:

8. All creatives use creative thinking techniques – most relate to close associative leaps, and product and user information.
9. Too much information in the brief limits originality because it sets primes and hence limits the starting point for divergent thinking.
10. Developing creative ideas requires a broad basis of starting points. The use of forced divergence techniques is a method to generate ideas and overcome creative blocks.

The qualitative nature of these findings mean that further, more quantitative, support is needed to test the contentions. The aim of this chapter is to refine the research instrument developed in chapters seven and eight to a stage where it could be used to quantifiably test the following effects: a) to determine the influence of creative thinking techniques on creative problem solving, b) to determine how information in the problem may trigger domain specific knowledge that may limit the originality of responses. To test these effects different sample populations that possess differing: a) levels of expertise in creative thinking techniques and, b) domain specific knowledge, would be used.

8.1 Methodology – The Theoretical Basis

The literature review and qualitative research highlighted two key issues to be addressed. First, the importance of primes that cue domain specific knowledge that then sets the anchor, or starting points, for memory combinations and might lead to fixation; and second, the influence of creative thinking techniques that replicate cognitive processes that encourage divergent domain combinations. These two factors are the focus of this methodological development.

8.1.1 Research Focus Anchor Points – Primed Information

One interesting finding from the Reiter-Palmon, Mumford, Boes & Runco (1997) article was the suggestion from the findings that a wide range of information may be beneficial for creative problem solving but this is not the case for all individuals. Given that information primed by the situation influences the creative thinking process (Hecht and Proffitt, 1994; Ward, 1994; Marsh, Landau and Hicks, 1996; Wiley, 1998; Ward, Patterson, Sifonis, Dodds & Saunders, 2002), it is hardly surprising that a person's domain specific knowledge will influence their subsequent creative idea generation processes. More knowledge of a domain will lead to greater use of that knowledge in subsequent creative idea generation processes.

For experts' their highly efficient knowledge structures result in efficient retrieval processes that lead to solution paths, and limit mental search space (Wiley, 1998). These solution paths set the parameters for memory search. This work by Wiley (1998) builds upon the research by Ward (1994) and others who use examples as primes in creative problem solving tasks. The strong influence of primed information in creative idea generation tasks indicates that those examples act as mental sets limiting the search space of experts. Primes can result in fixation, but may also act as facilitating information cues.

“A delicate balance clearly exists between (1) the facilitory effects of providing examples, analogies, and reminders (see e.g., Gick & Holyoak, 1980; Ross, Ryan & Tenpenny, 1989) and (2) the cognitive fixation (see e.g., Smith & Blankenship, 1991) or constraining effects on creativity that are the focus of present concern” (Marsh, Landau and Hicks, 1996, p.670)

Expert Respondents and Primes

Whether primes have a positive or negative influence on creative problem solving is dependent on the level of domain specific knowledge of the respondent in relation to those primes. Expert respondents, with high levels of domain specific knowledge in relation to the primed information, will find that the prime cues large amounts of information and causes mental set fixation; or stringent anchor points. In other words their primed knowledge will lead to searches for solutions along the categories opened by that primed information, which will not be unusual domains. They are likely to quickly define the problem in a certain normal way and find an adequate unoriginal solution within the domain. Expert's extensive knowledge will allow them to develop small c solutions but reduce the likelihood of big C combinations. However, given time the expert may be able to generate enough small c solutions that a significant change in the domain occurs.

Novice Respondents and Primes

On the other hand if a person is a novice in relation to the primed information, then the primed information will not lead to extensive related domain information being accessed. Without extensive domain information an adequate solution may not present itself and the novice will have to look toward more distant domains to find a solution, as long as they are motivated to do so. This will result in more original solutions. However, what is novel for them is not necessarily novel to the domain, and in fact is unlikely to be so.

Novice respondents will find that the primed knowledge will not prime a significant amount of information within the domain and hence other domains will have to be accessed to find a response. For the novice this might result in more divergent cross domain solutions, although it is unlikely that these responses will be appropriate. However, the high cognitive cost of trying to integrate new information might limit the creative processes. A big C finding is more likely if the novice in the initial domain is an expert in another domain and their use of the alternative domain to find a solution means they are able to view the solution from their area of expertise.

This proposition is inline with the findings on inadvertent plagiarism (Brown and Murphy, 1989); who found that people use primed information inadvertently and more importantly the extension to this finding by Tenpenny, Keraizakos, Lew and Phelan (1998), that found that inadvertent plagiarism does not occur if the primes are novel to the respondents. Essentially the effect of primed information depends upon the knowledge of the person viewing the situation.

Situational Information as Primes

Critical to the idea generation process is the situational information that a person comes across when encountering a problem. This situational information will prime domain specific knowledge that will be used in developing a solution. The more expertise a person has the more likely they are to find an existing solution to the problem within memory and the less likely they are to make new cross domain combinations.

Additionally, the domain specific knowledge of the expert will also result in extensive domain specific information being used in defining the problem and hence stringent anchor points being set that limit cross domain combinations occurring. Given that we all have differing levels of knowledge of various domains, that domain knowledge and its relationship with the knowledge of others in society will determine how unique our applied knowledge is. Hence it is contended that when domain specific knowledge is primed in the expert it will lead mental set fixation and less original responses.

The effect on appropriateness will be more difficult to gauge. If the primed information provides situation specific information that is needed to ensure an appropriate response under those conditions then these primes should lead to more appropriate responses. If on the other hand the situational primes provide information that is not appropriate, then it will open up memory categories in the expert that will not lead to an appropriate solution i.e. in a situation where a new solution is required. The domain expert would be better off without this information as they would develop a more appropriate solution without it. This contention can be tested using different primes and different sample populations.

8.1.2 The Importance of Creative Thinking Techniques/Cognitive processes

Creative thinking techniques, created by creative thinking practitioners such as De Bono (1968), are a means of varying the distance between the domains used in the recombination process. However, despite the fact that practitioners and researchers have been interested in the process of enhancing creativity for some time there are relatively few empirical studies into creative thinking techniques (Nickerson, 1999), especially outside the university environment. Creative thinking techniques appear to work by allowing new anchor points, or alternatively new combination points, to be used in the creative thinking process.

While primed domain specific knowledge limits the anchor points and reduces the propensity for big C cross domain combinations this can be overcome through divergent thinking techniques. Some people may have knowledge of creative thinking techniques that enable them to be able to cross over to entirely different domains in idea generation. These techniques can be used to either to: a) redefine the problem or set different anchor points, or b) they can be used to force respondents to think across domains to find combinations points from outside the domain of the problem.

These techniques are therefore either working to provide an unusual anchor point, or an unusual combination point for the idea generation process. They are essentially forcing a respondent to bring in more remote domains to be used in the creative combination process. This process can be achieved through a respondent choosing to think across category rather than the more usual within category search for a response. Indeed, this process appears to occur to some extent as soon as respondents are asked to provide 'a creative answer' (Harrington, 1975), and hence is a deliberate cognitive strategy.

Creative Thinking Techniques as Deliberate Cognitive Strategies

As discussed in chapters seven and eight, creativity may be more a result of the deliberate choice of cognitive processing strategy rather than any merely inherent associative abilities. Indeed, the four different potential responses can be categorized

into two different cognitive processes. Process one involves searching the existing domain for a solution while process two involves searching and combining more distant domains.

Process One: Within Domain Searches

Process one is probably the default response for most people. It involves using the memory categories that are primed by the situation to search for a solution down the existing domains that are primed. The longer the search, the more distant category thoughts will be opened as the person has to search for more and more remote ideas until an adequate solution is found that meets the evaluative criteria. As a person's category knowledge, or knowledge of the domain, increases, the more it is more likely that they will find a solution within this category without the high cognitive cost of cross domain combinations. This may be a reason big C creative breakthroughs reduce with age (Lehman, 1953).

The within domain search process generally results in ideas that were higher in appropriateness than originality – small c solutions. For example if you were to ask a person for 'Uses for a brick', that might activate the memory schemata on bricks and they move down that category to generate solutions. *Brick – smash a window, smash a glass, smash a crystal ball, build a house, build a castle*. Most responses will be similar responses to those known to society and therefore not original, although some new connections between similar domain concepts may be made - small c responses. If you keep moving out along these domains long enough you may eventually develop a big C idea.

Process Two: Cross Domain Searches

Process two occurs when the problem is defined as requiring a novel solution, and/or creative thinking techniques are used. This process ensures a deliberate activation of highly unusual or distant domain to act as the basis for creative idea generation. For example, if you were to ask a person for 'Uses for a brick', they might use a technique and activate a very unusual memory schema to act as a basis for idea generation. An unusual memory category might be the term 'window', and responses might therefore

be – use the brick to shore up a window against a tornado; the brick may have very small holes in it that act as windows for ants; brick up the window to guard against looters if law and order breaks down.

The responses will be unusual and most would also be bizarre ideas as they do not suit the situation, but some might also prove to be both original and highly appropriate - big C ideas. This process of deliberately setting a highly distant domain concept for use in the combination process is referred to in this thesis as forced divergence. These forced divergence techniques provide an associative word or idea that can then be used in idea generation. It is hypothesized that forced divergence techniques will increase the originality and reduce the appropriateness of responses. This will be tested by either providing or not providing different sample groups' instructions that require the use of a forced divergence technique.

8.1.3 Interaction Effects – Creative Thinking Techniques and Domain Specific Knowledge

An additional question in this research is how much do people rely on knowledge that is primed by the situation rather than using divergent thinking processes to come up with more divergent ideas. It is hypothesized that when people have knowledge of cognitive processes that allow cross category links they will be less reliant on domain specific knowledge and less likely to be fixated with that knowledge.

To test the various effects required the analysis of sample groups that differ in their knowledge of the domain and creative thinking processes. Three groups were chosen, undergraduate students, advertising creative personnel and account personnel.

A final hypothesis comes from the pre-test results. This hypothesis is that there will be a negative response bias against the self assessment rating of creative ideas. As mentioned in chapter, eight there appears to be a negative assessment bias when respondents used a creative thinking technique. This was an unexpected result, but can be explained by the fact that respondents might think that the use of techniques results in a more structured, less creative, response.

8.2 Hypotheses

H1 – Self ratings of originality will be lower than independently judged ratings of originality when participants are instructed to use forced divergent thinking techniques.

H2a – Independently judged ratings of originality will be higher for domain novices when they are instructed to use the forced divergent techniques than when they are not.

H2b – Independently judged ratings of appropriateness will be lower for domain novices when they are instructed to use the forced divergent techniques than when they are not.

H3a - Independently judged ratings of originality will be lower for technique experts when they are instructed to use the forced divergent techniques than when they are not.

H3b - Independently judged ratings of appropriateness will be lower for technique experts when they are instructed to use the forced divergent techniques than when they are not.

H4 – Primed domain specific knowledge (i.e. campaign primes) will affect account executives differently than creatives (both domain experts). Specifically:

H4a – Campaign primes will reduce originality compared to no primes for account executives (creativity technique novices), but not for creatives (creativity technique experts) and,

H4b - Campaign primes will reduce appropriateness compared to no primes for account executives (creativity technique novices), but not for creatives (creativity technique experts)

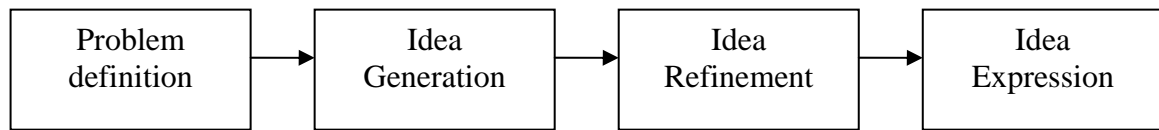
H5a- Campaign primes will decrease originality compared to no primes for domain novices (e.g, students), but not for domain experts (e.g. executives and creatives).

H5b- Campaign primes will increase appropriateness compared to no primes for domain novices (e.g, students), but not for domain experts (e.g., executives and creatives).

H6 – Creative thinking technique experts (e.g. creatives) will generate more original responses than creative thinking technique novices (e.g. students and executives) regardless of primed domain specific knowledge.

8.3 Study Focus

Figure 8.1: The Four Stage Model of Creativity



As domain specific knowledge, creative thinking techniques and anchor points will have differing impacts on each of the four stages of the creative thinking process the study was designed to only analyze the second stage of the creative thinking process. The initial part of problem definition was removed by providing a clearly defined problem, although information was manipulated to prime domain specific knowledge. As per the study by Reiter-Palmon, Mumford & Threlfall (1998), the problem was a real life problem designed to reflect situations that were very familiar to the advertising agency sample groups, and not beyond the scope of understanding for the student population.

The problem was ill-defined and there are countless potential solutions available to respondents. To encourage creative rather than the use of habitual responses instructions required participants to develop three ‘creative’ advertisements. Given that originality is the most widely accepted component of the term ‘creative’, respondents should therefore be looking to use creative thinking processes rather than repeating existing solutions.

The creative task was similar to a creative task used by Mumford, Baughman, Maher, Costanza & Supinski (1997), where respondents were required to develop a television advertisement for a new product. In this case however, rather than a 3-D Holographic Television being used as the product category, household insecticide spray, or fly spray, was the product category. This product category was chosen given that all the sample groups will have had extensive exposure to the category. The target market group was always 21-35 year olds, as this demographic fit with the characteristics of the majority of the sample respondents.

The effects of the internal evaluation and idea refinement was removed by requiring three ideas to be developed within a one hour period and using instructions that emphasized idea generation processes. Idea expression stages were minimized by using instructions that informed participants that there were no incorrect or correct responses and that the researchers were not looking at individual responses, but comparisons across different sample populations. It was also emphasized that the name of the respondent was not required. For the purpose of the study therefore, the emphasis was on looking at factors that influence the generation of creative ideas, and the creativity of those ideas.

8.4 Sample Populations

Initially three sample populations groups were chosen as a basis for study; although the student sample was further divided into those with English as a first, or a second, language. The resultant four sample populations where: a) undergraduate students where English was their first language, b) undergraduate students where English was not their first language, c) advertising creative personnel – advertising creatives and art directors, and d) advertising account executives– account executives and planners.

Undergraduate Student Samples

The first sample population chosen was undergraduate students. This population was chosen for two reasons: i) undergraduate students provide a good population for comparison with people in advertising agencies as they do not have the same degree of experience and knowledge of the advertising domain, or creative thinking practices and techniques; they are domain and technique novices, and ii) students are a common sample population group used in the academic creativity literature, and hence information from this group can be compared with other research.

This sample was split into two groups as the pre-test showed that English as a second language students had considerable difficulty with the creative thinking task. This was probably due to the fact that creative thinking requires distant domain combination processes which are highly mentally taxing and as the instructions were in English the very process of comprehension would be mentally taxing for this group. This would therefore leave limited cognitive processing capacity free for creative thinking processes.

Advertising Agency Personnel Samples

The advertising agency was chosen as the basis for the research given its emphasis on creativity and strong use of creative thinking techniques. Within the advertising agency two sample groups were chosen 1) advertising creative personnel and, 2) account executives. These two groups were chosen due to their differing roles within the agency and subsequent differing levels of various aspects of advertising domain knowledge and knowledge of creative thinking techniques. Advertising creatives personnel were chosen given their unique job that focuses on developing creative ideas and their knowledge of creative thinking techniques; they are technique experts. Account executives were chosen given their job focus on client issues and appropriateness criteria; they are experts on appropriateness issues in the advertising domain.

The sample characteristics are shown in Table 8.1 below.

Table 8.1: Sample Population Characteristics

	<i>Low Knowledge of Advertising Appropriateness Criteria</i>	<i>Moderate Knowledge of Advertising Appropriateness Criteria</i>	<i>High Knowledge of Advertising Appropriateness Criteria</i>
<i>Low Knowledge of Creativity techniques</i>	Students		
<i>Low-Moderate Knowledge of Creativity techniques</i>			Advertising Executives
<i>High Knowledge of Creativity techniques</i>		Creatives	

8.4.1 Sample Populations - Domain Specific Knowledge Effects

To test the hypotheses required the analysis of sample groups that differ in their knowledge of the primed domain specific knowledge. The instructions mean that a variety of advertising domain knowledge would be primed. Four groups were chosen based upon these factors, undergraduate students where English was their first language, students where English was not their first language, advertising creative personnel and account personnel. Of the sample populations, the two student samples will have the least knowledge of the advertising domain and appropriateness criteria.

Creative personnel have moderate to high levels of knowledge, depending upon the extent to which they have worked on campaigns for the product category, and advertising executives would have a high degree of knowledge.

It would therefore be expected that account executives should provide the most appropriate responses, but less original responses when given instructions that prime their extensive appropriateness knowledge. For students where English was their second language the high cognitive cost of integrating the information in the instructions should mean that they have limited cognitive resources left for creative thinking processes.

8.4.2 Sample Populations - Creative Thinking Technique Effects

In relation to the effectiveness of creative thinking techniques the three groups will also have differing levels of knowledge and expertise in their use. Advertising creative personnel use a variety of creative thinking techniques in their daily activities. Students and account executives would not have knowledge of, or at least the level of experience, in associative techniques that is possessed by advertising creatives.

It is also proposed that a person may have strong divergent thinking creative abilities, but they are not activated due to their cognitive resources being used for other cognitive processes in new situations. As associative tasks require the linking of divergent memory categories and instructions were in English, it would be expected that this process would be far more difficult for students where English was not their first language. Subsequently, the English as a second language group that is instructed to use the creative thinking technique should rate significantly lower in relation to both originality and appropriateness criteria.

It would be expected that of the three remaining groups, students where English was their first language would have the least ability to develop original outcomes when they are not given a forced divergence technique, as they possess only limited knowledge, and/or experience, in the use of such techniques.

Account executives, as they are working in the advertising industry, may have been exposed to divergent thinking cognitive processes, and/or techniques. Advertising

account executives would therefore have a low to moderate knowledge or expertise of creative thinking techniques. The forced divergence techniques should therefore increase the originality of their responses. Creative personnel have extensive knowledge and expertise in the use of creative thinking techniques and will therefore produce the most original responses.

8.4.3 Sample Populations - Interaction Effects

In relation to the interaction effects between domain specific knowledge and creative thinking techniques, it is hypothesized that strong domain specific knowledge combined with techniques that assist individuals to cross memory categories will lead to greater levels of creativity relative to individuals with limited domain specific knowledge i.e. the advertising creatives with primed knowledge. However, without techniques, domain specific knowledge will result in less original but more appropriate solutions i.e. the account executives without creative thinking techniques.

Subsequently, it would be expected that account executives who used creative thinking techniques should be able to produce more creative responses than the student samples who either had, or did not, have the creative thinking technique. Therefore, account executives provide a comparison group, as while they do not have the same level of associative technique knowledge or experience as creatives, they possess strong domain specific knowledge. The undergraduate student populations would not possess strong knowledge and experience in associative techniques relative to the advertising personnel and additionally their knowledge of the advertising domain is limited.

8.5 Treatment Conditions

The main aims of the experiment were 1) to determine if the extent to which the primed domain specific knowledge influenced the development of new ideas in a creative idea generation task for the different sample populations by setting stringent anchor points/or mental set fixation, and 2) to determine if associative techniques would have a significant influence on the creativity of ideas generated by respondents in the different sample populations. To evaluate the effects of these two factors, three different treatment conditions were manipulated. The first two conditions related to primes.

8.5.1 Domain Specific Knowledge Manipulations

Two factors were manipulated to determine if respondents relied on them for the development of creative ideas. In an advertising setting there are a range of factors that are central to advertisement development. In this experiment the influence of anchor points was manipulated based upon priming knowledge of a previous campaign, and priming knowledge of target market attributes. The other factor that could have been manipulated was knowledge of the product benefits, or the competitive advantage. It was decided to keep this third factor consistent across all treatments as adding another factor would have extended the sample size requirements to a level not deemed feasible.

8.5.1.1 The First Treatment– Previous Campaign Knowledge

In the first treatment, information on a past unsuccessful campaign was provided in half of the cases, but it was not provided in the other half. Information on a fictitious advertising campaign that used a disease carrying cartoon fly called ‘Fester’ was provided to respondents in this condition. This is similar to the long running Raid campaign that uses ‘Lewie the Fly’, as their cartoon character. This campaign has run in both the New Zealand and American markets and therefore would prime related category memories. Respondents were told that this campaign idea was unsuccessful and hence should not have used it. If the respondents had relied on this domain specific knowledge it would be expected that, as in the Ward, Patterson, Sifonis, Dodds & Saunders (2002) experiments, respondents would develop advertisements that reflected the primed related memory categories.

8.5.1.2 The Second Treatment – Knowledge of the Consumer

The second treatment manipulation was target market information. Information on the target market was manipulated through the instructions provided on the cover page of the response booklets. The second treatment had two levels of consumer knowledge and was manipulated with respondents either receiving instructions to develop an advertisement for local consumers (either American or NZ), or for French consumers.

France was chosen as a population as there are strong stereotypical views of the country and its consumers (Lamont, 1992) and subsequently if respondents were to

rely on existing domain knowledge as the basis for idea generation those stereotypes should be easy to identify and evaluate.

In this experiment the level of domain specific knowledge in relation to product and industry knowledge was also evaluated based upon the subjects' experience working on previous accounts and knowledge of target market attributes. Data was collected from advertising personnel respondents pertaining to product categories and media worked on previously.

8.5.1.3 The Third Treatment – The Use of a Forced Divergence Technique

The third treatment manipulated the use of a simple forced divergent technique. The technique involved either providing, or not providing, key words and instructions on how to develop ideas based upon those key words. In this treatment half the respondents were told to use a key word to assist them in generating their creative ideas. The other half of the respondents had to generate creative ideas, in three separate advertisements, without the assistance of these words.

For this treatment the order of the associated words were randomized to remove order effects. Additionally, to determine if the degree of association between the word used in the forced divergent condition and the product category (fly spray) had an effect on creative outputs of the various groups, each of the three key words used had a differing degree of association, low, medium, and high, based upon data from the University of South Florida Word Association, Rhyme and Word Fragment Norms, (Nelson, McEvoy, Schreiber, 2004).

Three different key words were used for each of the three advertisements that respondents were asked to develop in the forced divergence treatment. Each of the three key words was selected from a master list of 120 key words. Each respondent in the treatment group had a key word that was a close, moderate, and distant association to the product category. The choice of word and their level of association were based upon the data provided by Nelson, McEvoy and Schreiber (2004).

The front page of the response booklet was an instruction page that provided an example of how to use the key word as a basis for idea generation. Following the

instructions page an additional instruction page, called a cover page, provided the key word to respondents. The order of the key words given to respondents, close, moderate, and distantly associated words, was randomized.

Additionally, it was anticipated that individual perceptions by respondents as to the level of association of the three words used in the forced divergence technique treatment may be different from that found in the research by Nelson, McEvoy, Schreiber, 2004 . Therefore, a manipulation check was used to test the degree of perceived association between the words used in the forced divergence conditions.

8.6 Method – Pre-Test

As discussed in chapter eight, a pre-test of the experimental response booklets was conducted on a group of sixty-six undergraduate students from the University of Waikato in Hamilton, New Zealand. The experiment was conducted over a one hour period and used to identify problems with the response booklet. The research instrument was based upon the pre-test instrument with the following changes:

1. In the United States the term ‘fly spray’ was changed to ‘household insecticide spray’ to reflect the difference between New Zealand and American terminology for this product
2. Changes were made to the measures used to capture domain specific knowledge effects. Changes were made in relation to consumer-based knowledge, the product category unique selling proposition, and knowledge of past campaigns. This resulted in an additional treatment with treatment one containing instructions to develop advertisements for local market consumers and treatment two containing instructions to develop advertisements for French consumers. The competitive advantage was not changed between subjects.
3. Instructions were made simpler and clearer in relation to the need for a new set of ideas to be developed for each of the three advertisements.
4. In the forced divergent technique booklet the key words were selected from a list of 30 different sets of words (refer Appendix 8).

5. Changes to the categorization data collected were made to reflect the differences between student and agency personnel. An additional question was added to the student self-assessment form for students to determine whether English was their first or second language.

8.7 Experimental Design

The experiment was a 2 X 2 X 2 full factorial, between subjects design. Three treatments were manipulated resulting in eight different conditions. Individual differences in creative ability were controlled by randomly assignment of respondents to one of the eight treatment conditions.

Table 8.2: Experimental Design Matrix

	<i>Creative Thinking Technique</i>	<i>No Creative Thinking Technique</i>	<i>Creative Thinking Technique</i>	<i>No Creative Thinking Technique</i>
<i>Domestic Consumers: USA/NZ</i>	Knowledge of Past Campaign	Knowledge of Past Campaign	No Knowledge of Past Campaign	No Knowledge of Past Campaign
<i>Foreign Consumers: France</i>	Knowledge of Past Campaign	Knowledge of Past Campaign	No Knowledge of Past Campaign	No Knowledge of Past Campaign

8.7.1 Participants

The experiment used three different sample populations, advertising executives, advertising creative personnel and undergraduate students. The sixty-three advertising executives and fifty creatives were from advertising agencies in New York and Auckland (N.Z.), and they volunteered to take part in the experiment during their normal office hours. The agencies are leading global agencies and were both recent winners of agency of the year awards. The ninety-nine undergraduate students were from the University of Waikato in Hamilton New Zealand and they volunteered to take part in the experiment as part of their normal class lessons.

Participants were unaware of the different conditions under study and were allocated to one of the eight conditions by the response booklet that they received. Booklets

were systematically varied from condition one to eight to ensure participants were allocated to different randomised conditions. Each booklet asked the respondent to develop three separate advertisements for the same client. None of the respondents had worked on insecticide advertising before.

8.7.2 Materials

A response booklet was developed (refer Appendix 9) in which instructions were used to manipulate the three treatments resulting in the following eight conditions:

1. Local Target Market (A), Past Campaign/Fester (F), Creative Thinking Technique (CTT), – Labeled AFCTT
2. Foreign Target Market (F), Past Campaign/Fester (F), Creative Thinking Technique (CTT), – Labeled FFCTT
3. Local Target Market (A), No Past Campaign/Fester, Creative Thinking Technique (CTT), – Labeled ACTT
4. Foreign Target Market (F), No Past Campaign/Fester, Creative Thinking Technique (CTT), – Labeled FCTT
5. Local Target Market (A), Past Campaign/Fester (F), No Creative Thinking Technique, – Labeled AF
6. Foreign Target Market (F), Past Campaign/Fester (F), No Creative Thinking Technique, – Labeled FF
7. Local Target Market (A), No Past Campaign/Fester, No Creative Thinking Technique, – Labeled A
8. Foreign Target Market (F), No Past Campaign/Fester, No Creative Thinking Technique, – Labeled F

8.7.3 Instructions

The product category chosen was household insecticide spray. This category was chosen as it is a common product with which all sample populations have knowledge and experience. It is also a product category that is commonly advertised using popular mass media. Respondents were required to complete the task individually so as to avoid the confounding effect of group interactions.

To overcome the external validity problem that is caused by laboratory experiments that present respondents with well-defined problems (Nickerson, 1999), the experiment used a common real world problem faced by people within the advertising industry. Indeed, after the experiment a number of participants asked if the product was an actual product that was coming to market.

The first treatment manipulated was domain specific knowledge in relation to the target market. Respondents were either told that they were developing advertisements for local consumers – either American or New Zealand consumers, or French consumers. Subsequently the response booklets either had one of the following two instructions;

1. You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the *French* market. ... The target market is upper-middle class *French* consumers, both male and female, between the ages of 21 and 35
2. You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the *American/New Zealand* market. ... The target market is upper-middle class *American/New Zealand* consumers, both male and female, between the ages of 21 and 35.

The second treatment manipulated was the knowledge of past advertising campaigns by either providing, or not providing, information on a campaign concept that has been used extensively in New Zealand and America in the past. The campaign was a version of the popular ‘Raid’ advertising campaign that has run in both the New Zealand markets over the past decade. The Raid campaign uses a cartoon character called Lewie the Fly. An alternative cartoon character called ‘Fester’ was used in the response booklets that contained this treatment. Subsequently the response booklets either had the following instruction or they did not;

1. *In the past the company used the concept of a disease-carrying cartoon fly called ‘Fester’, much like the ‘Raid’ campaign. This advertising concept has been unsuccessful.*

The strength of the primed domain specific knowledge effect was emphasized by adding in the sentence “This advertising concept has been unsuccessful”. Given this instruction respondents should be motivated to use a different creative idea. If respondents still used a cartoon fly character this would strengthen the argument for a strong domain specific knowledge effect.

The third treatment manipulated the use of a forced divergent technique by either providing or not providing key words and instructions on developing each of the three lists of creative ideas based upon those key words. In this treatment half the respondents were told to use a key word to assist them in generating their creative ideas. Alternatively respondents had to generate creative ideas, and three separate advertisements, without the assistance of these words. Subsequently the response booklets either had one of the following two instructions;

1. When generating your ideas please use the key word provided on each cover page to help you. As a non-advertising example, if I were asked to ‘develop creative uses for a brick,’ and the key word was ‘WATER’, the ideas that come to mind might be:
 5. Use it to splash a person who was walking past a lake
 6. Use it on a wet path to keep my feet dry
 7. Use it to dam up a very small stream
 8. Use it to plug a hole in a dam
2. As a non-advertising example, if I were asked to ‘develop creative uses for a brick,’ the ideas that come to mind might be:
 1. Use it to smash a window
 2. Use it to smash a glass table
 3. Use it to prop up a leaning table
 4. Use it to block up a very small window

In addition to these instructions that were written on the cover page, additional instructions were used to reinforce the requirements of this manipulation. These instructions were on the second page and differed primarily based upon the presence of the key word;

1.

Key Word 1 – STONE

Please remember to:

- During the first few minutes list your 1st set of creative ideas on the next page
- During the remaining minutes of the 20 minute segment, use the two pages after the Creative Ideas Page to develop your chosen idea into Creative Advertisement 1
- Use the key word (STONE) to assist you in generating your creative ideas.

2. Please remember to:

- During the first few minutes list your 1st set of creative ideas on the next page
- During the remaining minutes of the 20 minute segment, use the two pages after the Creative Ideas Page to develop your chosen idea into Creative Advertisement 1

Respondents were told that they were to develop three separate advertisements. Respondents were given instructions to spend the first few minutes developing a list of creative ideas and then to choose the best idea from that list to develop into a magazine advertisement. Respondents were told to use the remaining minutes in the 20 minute block on each advertisement respectively and not to move onto the next advertisement until they had fully used the time allocated.

8.7.4 Procedure

The experiment was undertaken during either normal working or class hours and participants in the student sample were told that they had full discretion in terms of the questions they answered and the depth of response. Instructions for the session were provided to respondents by the researchers. The majority of the respondents responded to the survey in small groups in a common meeting room although, where necessary to ensure adequate sample sizes, some respondents were tested in their offices.

Once the response booklets were handed out to respondents the instructor asked participants to read the instructions carefully and answer the questions to the best of their ability. Respondents were told that there were no correct or incorrect responses.

The instructor informed respondents as to when they had five minutes remaining on each of the sections and when it was time to move onto the development of the next advertisement. Participants were also told that they did not need to put their names anywhere on the form as individual responses were not analyzed. The instructor also told respondents when they had five minutes left for each of the three separate development tasks and instructed respondents when it was time to move onto the next task.

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.

8.8 Measures

Any method of judgment has potential problems such as interjudge reliability and discriminant validity (Refer Hocevar, 1981 for a more detailed discussion), to overcome some of these problems two different judgment methods were used. First, respondents filled out a self-assessment form that was contained on the final two pages of the booklet (refer Appendices 10 & 11). Self judgment was given support by Hocevar (1981) in his review of the creativity measurement literature. As noted by Hocevar self evaluation has the advantage in that it is the subject who best knows themselves. This self-assessment form contained six, seven point likert scales where participants rated their three advertisements on originality, appropriateness, creativity, attention, communication of benefits, and effectiveness respectively.

Participants were also asked to rate their advertisements in comparison to other advertisement they had seen on ten additional factors taken from the measure developed by Koslow, Sasser & Riordan (2003). In the forced divergence treatment where key words were used, respondents were asked to rate the three words as to their level of association with the product category and were asked a range of classification questions. Finally responses were assessed by the three judges blind to the experiment to ascertain an external evaluation of appropriateness, originality and creativity (refer chapter 10). This independent coding process is discussed in chapter 10.

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9.0 Experimental Coding

Data was collected from four different sample populations;

1. Undergraduate students where English is their first language
2. Undergraduate students where English is not their first language
3. Advertising account personnel
4. Advertising creative personnel (advertising creatives and art directors)

The three treatment conditions resulted in the following eight treatments in the experimental design. Participants were randomly assigned to one of the eight experimental conditions.

9. Local Target Market (L), Past Campaign(PC), Divergent Thinking Technique (DT), – Labeled LPCDT
10. Foreign Target Market (F), Past Campaign (PC), Divergent Thinking Technique (DT), – Labeled FPCDT
11. Local Target Market (L), No Past Campaign (NC), Divergent Thinking Technique (DT), – Labeled LNCNT
12. Foreign Target Market (F), No Past Campaign (NC), Divergent Thinking Technique (DT), – Labeled FNCNT
13. Local Target Market (L), Past Campaign (PC), No Divergent Thinking Technique (NT), – Labeled LPCNT
14. Foreign Target Market (F), Past Campaign (PC), No Divergent Thinking Technique (NT), – Labeled FPCNT
15. Local Target Market (L), No Past Campaign (NC), No Divergent Thinking Technique (NT), – Labeled LNCNT
16. Foreign Target Market (F), No Past Campaign (NC), No Divergent Thinking Technique (NT), – Labeled FNCNT

A total of 214 response booklets were completed. A breakdown of the cell treatment composition is shown in the table 9.1 below.

Table 9.1: Cell Treatment Numbers

	<i>AFCTT</i>	<i>FFCTT</i>	<i>ACTT</i>	<i>FCTT</i>	<i>AF</i>	<i>FF</i>	<i>A</i>	<i>F</i>	<i>Total</i>
<i>Creatives</i>	8	6	5	6	6	7	7	5	50
<i>Ad Exec's</i>	8	10	9	7	8	7	6	8	63
<i>Student English</i>	7	4	6	7	8	7	6	8	44
<i>Student 2nd Lang</i>	10	7	7	4	3	10	9	5	55

*+2 Production People

9.1 Coding Procedure – Method One: Self Assessment

Measurement of the creative outputs of participants was done using two different methods. The first method was a self-assessment measure. Participants undertook this measure immediately upon completion of their third chosen advertisement. In this measure participants filled out a self-assessment form that was contained on the final two pages of the booklet (refer Appendices 9 & 11). The measure contained three different categories of questions.

9.1.1 Category One – Self Analysis of their Chosen Advertisement

The first category of questions was a self analysis by participants of their three chosen advertisements. This category contained six questions that provided a self-assessment of the advertisements. The six questions measured 15 different variables for each of the three advertisements. All questions used seven point likert scales, either 1 to 7, or -3 to 3.

The first four questions were seven point likert scales where participants rated their three advertisements on creativity, attention, persuasion, and effectiveness respectively. Participants were asked to use their own subjective definition of the four factors. The first of these questions is shown below.

1. Using your own definition of creativity how would you rate your three advertisements for their level of *CREATIVITY* using the following 1-7 rating scale? A rating of One (1) would indicate you thought the advertisement was extremely uncreative with a Seven (7) being extremely creative. (Please Circle)

	Extremely Uncreative					Extremely Creative	
Your first advertisement:	1	2	3	4	5	6	7
Your second advertisement:	1	2	3	4	5	6	7
Your third advertisement:	1	2	3	4	5	6	7

For participants in the forced divergent treatment a post manipulation check question was added to determine their perceived level of association between the three associative words used in the divergent thinking technique and the product category fly spray. An additional question was added where participants were asked to rate the three words as to their level of association with the product category. This additional question used a three-point rating scale, with one being the word with the strongest perceived association, and three being the word with the weakest perceived association. This question is shown below.

5. For the three words in the table below, please rate how associated they are with 'household insecticide spray'. A rating of 1 would be a very weak association and a rating of 7 a very strong association. For example the terms DAY and NIGHT are strongly associated, whereas DAY and SCISSORS are weakly associated.

	Weak Association					Strong Association	
Frog	1	2	3	4	5	6	7
Sleep	1	2	3	4	5	6	7
Winter	1	2	3	4	5	6	7

The next question asked participants to rate their advertisements in comparison to other advertisement they had seen for the same product category on nine additional factors taken from the measure developed by Koslow, Sasser & Riordan (2003). These nine factors were designed to capture originality, appropriateness and executional factors. This question is shown below.

6. Please use the scale below to tell us to what extent you agree with the statements in the table below. Please write the appropriate numbers in the boxes to the right of each statement for each of your three advertisements

If your answer is...	Strongly disagree	Disagree	Somewhat disagree	Neither	Somewhat agree	Agree	Strongly agree
Put this number in the box...	-3	-2	-1	0	+1	+2	+3

Compared to other advertisements for the product category you have seen, the three advertisements you developed were...	First Advert	Second Advert	Third Advert
...on strategy			
...original			
...a good fit with the strategy			
...imaginative			
...unexpected			
...novel			
...an appropriate strategy for the client			
...different			
...built on good strategy			

These first five questions also provided the basis for an independent measure as they were included in the same measures used by a panel of judges to evaluate participants' chosen creative advertisements

9.1.2 Category Two – Self Analysis of Creative Abilities

The second category of questions related to participants self assessment of their own creative abilities. This category contained two seven point likert scale questions requiring responses on 16 different items. This set of questions was only asked of the advertising personnel sample groups. These two questions were not asked of the student population, because they required participants to make comparisons that required industry experience.

The two questions were taken from the measures developed by Koslow, Sasser & Riordan (2003). The first of these two questions contained 10 variables and asked questions to ascertain the extent to which a respondent was a problem solver or a divergent thinker.

6. Compared to other employees in your area (e.g., creative, account, media, etc.) at my agency, I...	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly Agree
...am a good problem solver.	-3	-2	-1	0	+1	+2	+3
...come up with ideas that are all different from one another.	-3	-2	-1	0	+1	+2	+3
...follow the right steps to solve advertising problems.	-3	-2	-1	0	+1	+2	+3
...develop original ideas no one else thinks of.	-3	-2	-1	0	+1	+2	+3
...work my way through advertising problems.	-3	-2	-1	0	+1	+2	+3
...do a great job refining ideas.	-3	-2	-1	0	+1	+2	+3
...know how to solve advertising problems.	-3	-2	-1	0	+1	+2	+3
...develop many alternative ideas, not just one.	-3	-2	-1	0	+1	+2	+3
...think up a large number of ideas.	-3	-2	-1	0	+1	+2	+3
...am a good divergent thinker.	-3	-2	-1	0	+1	+2	+3

The second question contained questions pertaining to six variables, and was used as a measure of understanding of the advertising component requirements of the questions. This self assessment measure of creative thinking abilities were taken for comparison with independent judgments of their creative outputs.

7. In the creative work I just did for the household spray insecticide, I showed that I understood...	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly Agree
...the target consumer.	-3	-2	-1	0	+1	+2	+3
...the brand.	-3	-2	-1	0	+1	+2	+3
...the product category.	-3	-2	-1	0	+1	+2	+3
...the strategy to be used for the client.	-3	-2	-1	0	+1	+2	+3
...marketing strategy in general.	-3	-2	-1	0	+1	+2	+3
...the media used.	-3	-2	-1	0	+1	+2	+3

9.1.3 Category Three – Classification Questions

The third category of questions collected classification information from the participants. In this third category advertising personnel were asked nine questions relating to demographic and work experience categories, while the student samples were asked four questions (refer Appendices 10 & 11). Advertising personnel were asked their job title, rank, level of experience on different types of campaigns and media and in the industry as well as basic demographic and education details. These

questions were also taken from the measure developed by Koslow, Sasser & Riordan (2003) to be used to determine their influence, if any, on creative outputs.

The student sample was asked four questions, one relating to knowledge and experience of advertising, either through industry or promotional courses, a question asking if English was their first language, and two basic questions on demographics; age and gender.

As the self-assessment measure was a subjective measure undertaken by the respondent and needed no further coding, the responses were inputted directly into an excel spreadsheet by the researcher and a seasonal assistant. The first 16 headings category headings are the same as those used by the three judges to independently evaluate the responses. This provided a measure of comparison between the self measures of creative ideas and the independent measures.

9.2 Coding Procedure – Method Two: Independent Assessment

The second measurement method was the independent coding of a range of factors by three judges blind to the experimental conditions. The coding instrument used by the judges contained two categories. These categories related to the two tasks required from the respondents: 1) the generation of a list of advertising ideas, and 2) the selection and development of one of those ideas into an advertisement. For the coding instrument the judges evaluated the second task prior to the first. In other words the first section of the judges coding instrument related to the three chosen advertisements that were developed by each respondent into an advertisement. The second section related to the creative ideas generated by each respondent. This was done so that the ideas generated by the respondent would not influence the judges' view of the originality of the responses.

9.2.1 Category One – Independent Analysis of their Chosen Advertisements

In category one judges evaluated each of the three advertisements using nine questions which contained 26 items. As with the self-assessment measure, judges rated these factors on a seven point scale, either 1 to 7 or –3 to 3. The first question in this category required judgment on the 13 variables included in the first five questions contained in the self-assessment questions undertaken by participants.

In addition to these 13 variables four additional variables were added to this question as an evaluation of artistry elements. One issue in advertising creativity research is the distinction between artistry and creativity (Koslow, Sasser & Riordan, 2003), so to determine if this was a significant factor measures of artistry were also included in the judgment criteria. These variables were added given the findings of Koslow, Sasser & Riordan (2003), that advertisements used artistic elements as a substitute for originality if unable to develop original ideas. The executional craft elements were:

1. had highly elaborated ideas
2. were well polished
3. showed strong ad execution skills
4. a complete coherent advertisement

In addition two variables were added to this question in order to capture a fuller range of advertising related requirements;

1. appropriate for the target market
2. emotionally expressive

The next two questions were used to evaluate if there was a theme running through, or between, the three advertisements developed. The first of these questions required a judgment to be made on the degree of difference between the three chosen advertisements as a comparison between different pairing of the advertisements; 1st and 2nd, 2nd and 3rd, 1st and 3rd. The second of these questions asked for a judgment on the extent to which the judges thought there was a deliberate theme running throughout the three advertisements. Both questions used a seven point likert scale. These questions were asked to evaluate if a participant had become fixated on concept and to determine if this was influenced by domain specific knowledge.

The next six questions were in two parts. First, judges were asked to identify and list any references that were made to the target market, and given a reference was identified, the judges were asked to write down what it was and note if it were a stereotype or a demographic reference. Second, judges were required to judge the extent to which they thought any reference to the target market was peripheral or fundamental to each of the three advertisements using a seven point likert scale. This process was repeated in the next two sets of questions for references to the Fester campaign and also references to the product's competitive advantage.

Finally in this section judges were given a box grid with originality on the horizontal axis and appropriateness on the vertical axis and asked to place the letters, A1, A2 and A3 as representations of the three advertising ideas developed by the participants in the appropriate section of the grid.

9.2.2 Category Two – Independent Assessment of the Creative Ideas Page

Category two related to the three creative ideas pages developed by each participant and asked four questions that looked at five variables. The first two questions related to research by Vanden Bergh, Reid & Schorin (1983) that has shown that there is a correlation between the number of ideas generated and the quality of those ideas. The first question required judges to identify the number of ideas developed for each of the three advertisements. Question two was a proxy measure used to support question one where judges were required to note the number of words and pictures on each of the three creative ideas pages.

Next judges were asked to make a subjective judgment as to whether they thought the idea chosen for development by the respondent was the most original idea on the creative ideas page. This question was added as participants may have chosen an idea to develop for reasons other than that idea being the most original advertisement and this may be influenced by sample population characteristics.

9.3 The Coder Training Process

The three judges selected were two doctoral assistants and one post-graduate student. Prior to their beginning coding the researcher undertook a training process. This process took place in two stages. First, judges were given a copy of the chosen advertisements and creative ideas page from two pre-test response booklets. The judges were also given a coders guide (refer Appendix 12) with a definition of the 17 items asked in the first category of questions. Without any further instructions they were asked to evaluate the ideas given the coding instrument (refer Appendix 13).

The responses were collated by the researchers and the researcher asked the judges to explain any differences between their judgments on the measures. This discussion only occurred during this initial training session, throughout the actual coding process no communication occurred between the judges. The researcher also provided clarification of judging criteria on certain categories. This process was repeated a second time and at this stage there was a high level of understanding as to the basis of measurement between the three judges. Judges were encouraged to discuss any perceptions they had regarding the coding instrument and as a response to this, 'question 13', relating to the recording of pictures, was added to the coding instrument.

9.3.1 The Sample Coding Analysis

Copies of the coding guide and coding instrument as well as the first 10% of the final response booklets were given to the coders. The order of the creative ideas page and creative development pages was reversed prior to being given to the coders. This was to minimize the possibility that repetition of similar ideas due to the use of a key word in the generation of ideas would lead to the coders reducing their originality judgments. Additionally, only the chosen advertisement pages and the creative ideas

pages were given to the judges so that they were unaware of which sample group each response booklet represented. This was done to remove any potential for bias.

The number of each of the sample groups provided in this first 10% was even across the four groups and the order was randomized. Once this initial coding process had been completed an analysis of results was undertaken. From this measure it was found that two questions were not adding any additional strength to the results and these measures were dropped. They were 'emotionally expressive' and the 'originality/appropriateness grid'. In all of the remaining measures there was a strong degree of agreement between the coders with 10 out of the 12 remaining measures from category one having a range of difference between the coders of two or less at least 75% of the time. Given this result it was decided that the measure of best fit for the data to be used would be the statistical average across the three judges rather than the alternative measure of selection - the majority decision.

9.3.2 The Main Coding Process

Coding took place over a period of five months with each judge coding approximately 10 response booklets each week. On average it took thirty minutes for each response booklet to be coded. The coding booklets were randomly ordered based upon the sample group as well as the three treatments, domain knowledge in relation to the past campaign, domain knowledge in relation to the target market, and the creative thinking technique.

On completion of the coding process all responses were inputted into an excel spreadsheet and the average response from the three judges was calculated. At this stage a visual check of all the coding output was undertaken by the researcher. At this stage one of the coders output was found to lack any variability across a number of response booklets and the coder was asked to recode those booklets. Response variability was analyzed and is shown in the next chapter. This independent coder data was then added to the self assessment data and the data was analyzed using the

statistical package, SAS. A number of statistical analyses were undertaken on the data and these and the results are the focus of the next chapter.

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10.0 Analysis of the Results

The primary aims of the study were to determine: a) the effect of creative thinking techniques on different sample populations, b) the effect of existing knowledge on creativity, and c) the interaction effects between existing knowledge and creative thinking techniques.

Once the data had been sorted and cleaned, a variety of statistical analysis were undertaken on it using the Statistical Analysis System (SAS) statistical package. First a component factor analysis was run on the variables from the self assessment questions, as well as the first coding question for the independently judges. These questions used a variety of scales to evaluate the creative ideas generated by respondents. From this analysis a parallel measure with two factors was clearly evident and this was used in the subsequent regression analyses to determine the effect of treatment conditions on the resultant factors –originality and appropriateness.

This chapter presents the main effects from the analysis of the data set, while chapters 12-14 graphically illustrate the data and discuss the effects and implications. As outlined in Chapter 9, two methods were used to evaluate the creativity of the advertisements and ideas developed by respondents; 1) self assessment and 2) independent coding.

10.1 Self Assessment Measures

Questions 1-4 and question 6 in the self-assessment questionnaire all related to the rating of their advertisements. Of these thirteen items, 8 loaded strongly onto two factors. Table 10.1 below shows the factor analysis results on those two factors.

Table 10.1: Self Assessment Factor Analysis: Eigenvalues of the Correlation**Matrix: Total = 8 Average = 1**

	Eigenvalue	Difference	Proportion	Cumulative
1	4.07	2.22	0.51	0.51
2	1.83	1.34	0.23	0.73
3	0.49	0.05	0.06	0.80
4	0.44	0.08	0.05	0.85
...				

As can be seen from the eigenvalues, the eight variables loaded onto two factors with 74% of the variance explained. The factor pattern shown in table 10.2 below illustrates the two factors which will be called: Factor 1 - Originality, and Factor 2 - Appropriateness. Inter-factor correlations between the two variables were 28%.

Table 10.2: Rotated Factor Analysis - Oblimin Rotation

	Factor 1 – Originality	Factor 2 – Appropriateness
Originality	0.82	0.02
Imaginative	0.85	0.05
Unexpected	0.89	-0.07
Novel	0.81	0.07
Different	0.89	-0.05
Strategic Fit	-0.05	0.88
Appropriate Strategy	-0.01	0.86
Built on Good Strategy	0.07	0.81

10.1.1 Inter-Factor Correlations

	Originality	Appropriateness
Originality	1.00	0.29
Appropriateness	0.29	1.00

10.2 Independent Assessment Measures

For the independent coding the level of agreement between the judges was first assessed using factor analysis. Results are shown in Table 10.3 below. As can be seen from the table the level of agreement between the three coders was over 59%. While this could be better, given the scale was a seven point continuous scale, this was deemed adequate. A Cronbach's α was also calculated $\alpha=.67$ indicating an acceptable level of agreement between the three judges.

Table 10.3: Level of Agreement between the Coders

	Eigenvalue	Difference	Proportion	Cumulative
Coder 1	1.77	1.12	0.59	0.59
Coder 2	0.65	0.08	0.21	0.81
Coder 3	0.57		0.19	1.00

10.2.1 Judges Evaluation

Next a factor analysis was run on the data to determine the loading of the independently judged variables onto the two factors. For the independently judged data a factor analysis was undertaken on variables that matched those used in the self-assessment measure in Table 10.2. The same eight variables loaded onto the two factors with over 89% of the variance explained. This indicates a sound overall

measure as they both differentiated well between the two factors: appropriateness and originality, and explain the variance well. Tables 10.4 and 10.5 below show the factor analysis results and inter-factor correlations. The inter-factor correlations were higher at almost 38% indicating the independent judges viewed some relationship between the two factors.

Table 10.4: Independent Assessment Factor Analysis: Eigenvalues of the Correlation Matrix: Total = 8 Average = 1

	Eigenvalue	Difference	Proportion	Cumulative
	5.13	3.13	0.64	0.64
	2.00	1.77	0.25	0.89
	0.23	0.04	0.03	0.92
	0.19	0.06	0.02	0.94
...				

Table 10.5: Rotated Factor Pattern - Oblimin Rotation

	Factor 1 – Originality	Factor 2 – Appropriateness
zOriginality	0.91	0.08
zImaginative	0.83	0.16
zUnexpected	0.99	-0.15
zNovel	0.90	0.07
zDifferent	0.97	-0.7
zStrategic Fit	-0.03	0.97
zAppropriate Strategy	0.08	0.96
zBuilt on Good Strategy	0.05	0.94

*Note: z – relates to data from the independently judged measure. The z is absent for data relating to the self reported measure.

10.2.2 Inter-Factor Correlations

	Originality	Appropriateness
Originality	1.00	0.38
Appropriateness	0.38	1.00

10.3 Creativity Measure

The combined creativity measure from Koslow, S., Sasser, S.L. & Riordan, E.A., (2003), using the following calculation. Creativity = (original + appropriate) + (original x appropriate), was used. The correlations between the self-assessment measures and the independent measure are shown in Table 10.6 below. Correlations between the measurement items are low indicating poor agreement between the two measures. The data was further analyzed to determine if this was due to the negative self-assessment bias indicated from the pre-test research.

Table 10.6: Correlations between the Two Measures

	Original	Appr	zOriginal	zAppro	Creative	zCreative
Original	1	0.29 >.0001	0.34 >.0001	0.01 0.82	0.61 >.0001	0.19 >.0001
Appr	0.29 >.0001	1	0.03 0.48	0.17 >.0001	0.63 >.0001	0.10 0.02
zOriginal	0.34 >.0001	0.03 0.48	1	0.38 >.0001	0.15 0.0002	0.60 >.0001
zAppr	0.01 0.82	0.17 >.0001	0.38 >.0001	1	0.06 0.16	0.70 >.0001
Creative	0.61 >.0001	0.63 >.0001	0.15 >.0001	0.06 0.16	1	0.13 0.0008
zCreative	0.19 >.0001	0.10 0.017	0.60 >.0001	0.70 >.0001	0.13 >.0008	1

*Note: z – relates to data from the independently judged measure. The z is absent for data relating to the self reported measure.

There are a number of potential reasons for the low inter-correlations between the two measures. One may be the different interpretations of the measurement terms under

analysis. Unlike the interdependent judges, respondents did not have any set definition for the measurement terms and each may have had different views of what terms such as creative and effective meant. This problem may have been particularly strong in the English as a second language sample group. Second, individual respondents having developed their own ideas would judge them based upon how they view their idea internally rather than merely the output, either graphic or written, that was used by the judges. Finally, a negative self-assessment bias, as suggested in the pre-test results (refer Chapter 9), may also have caused different results between the self-assessment and independently judged measures. These aspects will be discussed in detail in chapter 12.

10.4 Self-Assessment Technique Bias

To determine whether there was a negative self-assessment technique bias a comparison of the effect of the divergent thinking technique (technique), and also the treatment levels for the associated words, (treatment) on the self-assessed versus the independently assessed results was undertaken. The term ‘technique’ refers to the comparison of the treatments: divergent thinking technique treatment versus the no divergent thinking technique treatment with all three associative word levels are included in the divergent technique treatment. For the technique data ‘No’ refers to the treatment condition with no technique provided to respondents, while ‘Yes’ refers to the treatment condition where a technique was provided to respondents.

Alternatively, the phrase ‘Associative Word Level models the data with each associative word as a separate data set. For Associative Word Level data: ‘No’ refers to the group that was not provided with an associative technique, ‘Close’ - refers to a technique using a closely associated word, ‘Moderate’ - a moderately associated word and ‘Distant’ - a word with a distant association. The self report measures are written as Self Report Orig (Originality), Self Report Appro (Appropriateness) and Self Report Creat. (Creativity), while the independent assessed measures are Indep. Assessed ZOrig, Indep. Assessed ZAppro and Indep. Assessed Creat. First, an analysis of the effect of the technique on self-assessment scores on all three measures – originality, appropriateness and creative were compared with the

independently judged measures – zoriginality, zappropriateness and zcreative. Results are shown in Table 10.6 below. For the self reported scores on originality, appropriateness and creativity the R² of the regression equation modeled on the significant effects were only 0.03, 0.08 and 0.11 respectively with P values for the technique effects of 0.40, <0.001 and 0.002. For the independent assessed scores of zoriginality, zappropriateness, and zcreative, the R² of the regression equation modeled on the significant effects were 0.27, 0.36 and 0.24 respectively with P values for the technique effects of 0.61, 0.0004 and 0.13.

It was anticipated that the low levels of confidence relating to originality and zoriginality may be due to the English as a second language sample biasing the results. As this group consists primarily of international students they will be referred to as foreign students, whereas the English as a first language group will be referred to as domestic students. Therefore, the equation was also run excluding the foreign students.

Table 10.7: The Effect of Divergent Thinking Techniques on Self-Reported and Independently Assessed Originality, Appropriateness, and Creativity

Technique	Self Report	Indep. Assessed	Self Report	Indep. Assessed	Self Report	Indep. Assessed
All Samples	Orig. Pr > F	ZOrig Pr > F	Appro. Pr > F	ZAppro. Pr > F	Creative Pr > F	ZCreative Pr > F
	0.65	0.61	<0.0001	0.0004	0.004	0.13
No	0.05	-0.008	0.17	0.12	0.51	0.48
Yes	-0.02	0.03	-0.16	-0.11	0.06	0.29
Foreign Students						
No	0.17	0.07	<0.0001	0.01	<0.0001	0.17
Yes	0.14	0.18	0.23	0.39	0.73	0.86
	0.002	0.32	-0.14	0.20	-0.04	0.63

As can be seen from Table 10.17 above, the group that used the divergent thinking technique rated their scores lower than the group that did not use the technique. Additionally, while the technique was perceived by respondents to result in less original work, independent judges rated that work as the most creative of the various treatment conditions. This is an indication of a negative self-assessment bias for originality. For appropriateness the technique reduces appropriateness scores for both the respondent and the independent judges. The creativity measure resulted in lower scores in the technique group indicating the strong negative effect of the technique on appropriateness scores.

The overall effect was that the technique reduced appropriateness and increased originality in the independent judging but not the self-assessed originality scores. This indicates a negative self-assessment bias against the technique in regards to originality; however the low confidence levels means the results are tentative. Given the insignificant confidence levels, an analysis of individual sample groups was looked at. To correspond with the data analysis tables the term 'Area' is used to connote the different sample population groups. Results are shown in Table 10.8.

10.4.1 Two-Way Interaction Effect between the Technique and Area/Sample Group

Given the evidence of a negative self perception bias an analysis of the data was undertaken to determine if there was a two way interaction between technique and area. In other words, did different groups have different perceptions regarding the effects of the technique on originality. The results for $z_{\text{originality}}$ and $z_{\text{creativity}}$ were significant at the 95% level creativity, with creativity coming close to significance at the 90% level. The results for originality, appropriateness and $z_{\text{appropriateness}}$ were not significant at the 90% level but the result for originality is reported to show the comparison with the assessed originality score. The results are shown below in Table 10.8.

Table 10.8: Assessments of Originality and Creativity by Area for the Technique Versus No Technique Treatments

Tech	Area/ Sample Group	Self Report Orig Pr>F 0.52	Indep. Assessed ZOrig Pr>F 0.0002	Self Report Creat Pr>F 0.08	Indep. Assessed ZCreat Pr>F 0.03
No	Account	-0.03	-0.12	0.61	0.68
No	Creative	0.25	0.69	0.71	1.63
No	For Student	-0.14	-0.57	0.10	-0.83
No	Dom Stu.	0.11	-0.03	0.63	0.45
Yes	Account	-0.13	0.29	-0.24	0.77
Yes	Creative	0.06	0.46	0.33	0.82
Yes	For Student	-0.05	-0.87	0.20	-0.67
Yes	Dom Stu.	0.05	0.22	-0.04	0.24

For the above table the pattern of responses across the different sample population groups is interesting to note. In the non-technique treatment, account people, foreign students and domestic students all rated their work as more original than the independent judges. Creatives viewed their work as much less original than judges. For the combined creativity measure all the groups except the account people rated their work as more creative than the judges. For the technique treatment all of the groups except the foreign students rated their work as less original than the judges indicating a negative self-assessment bias against originality. Foreign students appeared to have had significant difficulties assessing their own work.

Additionally, across the two treatments, technique versus non-technique, the self-assessed ratings of originality were lower for the technique condition versus the condition where there was no technique except in the case of the foreign students. So in sum without a technique most groups rated their work higher than independently judged, and with the technique self-assessment scores were generally lower despite the fact that judges rated that work more positively. One exception was with the creatives who did better without the technique. This result was expected (refer chapter

9), given that advertising creatives are highly likely to know of better techniques than those provided in the experimental treatment.

10.4.2 Two-Way Interaction Effect between the Level of the Associative Word and the Sample Population

Another analysis of the data was undertaken to determine if there was a two way interaction between the different treatment levels and the different sample groups. The results are shown below in Table 10.9 for independently assessed originality only, as the self reported originality results were not significant. The pattern of responses across the different sample population groups is also interesting to note.

Table 10.9: Self-Assessed versus Independent Assessments of Originality for All Sample Population for the Different Associative Word Level

Associative Word Level	Area/Sample Respondent Group	Indep. Assessed ZOrig Pr > F 0.008	Associative Word Level	Area/Sample Respondent Group	Indep. Assessed ZOrig
No Tech.	Account	-0.12	Moderate	Account	0.17
No Tech.	Creative	0.69	Moderate	Creative	0.39
No Tech.	Dom. Student	-0.03	Moderate	Dom. Student	0.26
No Tech.	Foreign Stu.	-0.57	Moderate	Foreign Stu.	-0.82
Close	Account	0.25	Distant	Account	0.48
Close	Creative	0.46	Distant	Creative	0.47
Close	Dom. Student	0.16	Distant	Dom. Student	0.26
Close	Foreign Stu.	-1.04	Distant	Foreign Stu.	-0.64

For the account executives the worst independent rating occurred in the non-technique condition with the best in the distantly associated word treatment. For the most distant word association treatment their judged originality was at the same level as the creatives, although still lower than the score for creatives who had no technique. For the creatives the highest self assessment score occurred during the no technique

conditions while the treatment conditions did not appear to have a large effect on the originality of their outputs.

For the domestic students they followed the same pattern as the account people although treatment 2 and 3 did not change their overall originality levels significantly. Finally, for the foreign student sample their worst work occurred in the condition where the associative word was the most closely related to the product category and their least original work was in the no condition treatment.

The results above show very poor results for foreign students, however this sample group may have had different perceptions of the level of association between the three different words used in the treatment conditions as English is their second language. The data was analyzed to see if this was the case. Results are shown in Tables 10.10 and 10.11 below.

Table 10.10: Perceived Average Level of Association of the Three Forced Divergent Technique Associative Words by Area; and, the Average Perceived Level of Association across All Samples (Closeness)

Area Pr > F 0.27	Perceived Average Level of Association	Closeness of the Associative Word Pr > F <0.0001	Average Perceived Level of Association
Account	3.71	Close	5.27
Creative	3.96	Moderate	3.45
Foreign Student	4.15	Distant	2.95
Domestic Student	3.73		

As can be seen from the data above account executives and domestic students had an similar average perception across the three associated words that was lower than the other two groups. Creatives' average perception was higher than those two groups with the foreign students having the highest average perception rating. The average perceived level of association across all the sample groups showed the expected effect with the level of closeness between the associative word used and the product category decreasing in the expected direction. A further analysis of the perceived level

of average association by sample group was undertaken and is shown in Table 10.11 below.

Table 10.11: Perceived Average Level of Association of each of the Three Associative Words by Area

Area	Closeness of the Associative Word	LSMean	Area	Closeness of the Associative Word	LSMean
Pr > F 0.0002					
Account	Close	5.68	Foreign Student	Close	4.67
Account	Moderate	3.4	Foreign Student	Moderate	3.83
Account	Distant	2.00	Foreign Student	Distant	3.96
Creative	Close	5.50	Domestic Student	Close	5.24
Creative	Moderate	3.17	Domestic Student	Moderate	3.35
Creative	Distant	3.21	Domestic Student	Distant	2.61

The results for the account people and students reflect the expected pattern of associated results. The creatives perceive the first word to be most strongly associated but then they did not indicate much difference between the second and third words. This may be a reflection of a flatter associative hierarchy as per Mednick's (1962) theory. The same pattern of results occurs with the foreign students although the perceived difference between the words is lower. It would appear that foreign students have difficulty distinguishing between the level of association between the three words. Given this difference in perception a final analysis was run looking at the effect of the perceived level of association on originality, appropriateness and creativity for the data including, and excluding, the second language group. The results are shown in Table 10.12 below.

Table 10.12: The Effect of the Level of the Associative Word on Independently Assessed Originality, Appropriateness, and Creativity

Associative Word Level	Indep. Judged ZOrig Pr > F 0.38	Indep Judged ZAppro. Pr > F 0.005	Indep Judged ZCreative Pr > F 0.43	Past Campaign	Self-Report Orig Pr > F 0.65	Self Report Appro. Pr > F 0.0002	Self Report Creative Pr > F 0.0005
No	-0.009	0.12	0.44	No	0.06	0.16	0.61
Close	-0.04	-0.12	0.26	Close	0.03	-0.03	0.07
Moderate	-0.001	-0.15	0.26	Moderate	-0.08	-0.22	-0.18
Distant	0.14	-0.08	0.54	Distant	-0.03	-0.22	0.12
Exclude For Stu	Pr > F 0.22	Pr > F 0.17	Pr > F 0.35		Pr > F 0.51	Pr > F 0.0002	Pr > F 0.0002
No	0.18	0.38	0.83	No	0.13	0.22	0.73
Close	0.29	0.22	0.53	Close	0.08	0.04	0.16
Moderate	0.27	0.17	0.53	Moderate	-0.07	-0.25	-0.32
Distant	0.40	0.24	0.86	Distant	0.02	-0.20	0.06

As can be seen from the data in the table above, the independent ratings of originality are much higher when the foreign student sample data is excluded. The negative originality self-assessment bias is much more prevalent when the low outlying scores from the foreign students are excluded.

10.5 Other Significant One-Way, Two-Way and Three-Way Effects

Given the low predictive ability of the self-assessment data, with R^2 's of the various self-assessment equations being only 0.03, 0.08 and 0.11 for originality, appropriateness and creativity respectively, the independent judgments were used as the basis for the remaining analysis. This analysis involved modeling of the data, with regression analyses undertaken to determine the effect of the various treatment conditions on originality, appropriateness and creativity.

10.5.1 Independently Assessed Originality

For assessed originality five treatments proved significant predictors of originality: an order effect, information on a past campaign, the area/sample group, as well as two interactions - technique and area; and technique and past campaign information. These effects are shown in Tables 10.16, 10.17, 10.19 and 10.20. The R^2 for the regression equation was 0.27. Effect sizes for all of the significant effects are given in appendix 14.

Table 10.13: Independently Assessed Originality

Source	DF	Type III SS	Pr > F
technique	1	0.20	0.61
past_campaign	1	7.37	0.002
area	3	134.46	<.0001
order	1	9.34	0.0004
tech*area	3	15.08	0.0002
tech*past_camp	1	4.50	0.01

10.5.2 Independently Assessed Appropriateness

For assessed appropriateness five factors proved significant predictors of appropriateness: the divergent thinking technique, order, the area/sample group, as well as two interactions; past campaign and area, and country and area. These effects are shown in Tables 10.16, 10.17, 10.21 and 10.22. The R^2 for the regression equation was 0.36.

Table 10.14: Independently Assessed Appropriateness

Source	DF	Type III SS	Pr > F
technique	1	8.36	0.0004
past_campaign	1	0.0004	0.98
country	1	0.62	0.33
area	3	176.05	<.0001
order	2	2.70	0.043
past_cam*area	3	9.49	0.003
country*area	3	19.58	<.0001

10.5.3 Independently Assessed Creativity

For the combined measure assessed creativity seven treatments proved significant predictors of creativity: the area/sample group, order, the number of pictures a respondent developed, as well as four interactions – technique and area; past campaign and technique; past campaign and area; and country and area. These effects are shown in Tables 10.16, 10.17, 10.18, 10.23 and 10.24. The R^2 for the regression equation was 0.24 based upon the factors significant to the modeling.

Table 10.15: Independently Assessed Creativity

Source	DF	Type III SS	Pr > F
area	3	318.95	<.0001
number of pics	1	15.29	0.01
order	2	22.52	0.003
tech*area	3	22.09	0.03
past_cam*area	3	22.28	0.03
country*area	3	23.84	0.02
tech*past_camp*area	4	31.62	0.01

10.6 One Way Effects

An analysis of various one way effects was undertaken. Given the problems with the foreign student sample these analysis were undertaken both with and without that sample. Only results significant or close to significance at the 90% level or above are shown. The effect of order and past campaign information is shown in Table 10.16 below.

Table 10.16: The Effect of Order on Independently Assessed Originality, Appropriateness, and Creativity

Order	Indep. Assessed ZOrig Pr > F 0.002	Indep. Assessed ZAprro Pr > F 0.13	Indep. Assessed ZCreative Pr > F 0.009
First	-0.15	-0.07	0.19
Second	0.03	0.003	0.33
Third	0.15	0.09	0.64
Excluding Foreign Students	Pr > F 0.007	Pr > F 0.36	Pr > F 0.008
First	0.10	0.22	0.46
Second	0.25	0.31	0.70
Third	0.40	0.36	1.06

As can be seen from the table above, for both sets of data there is an order effect for all three measures; originality, appropriateness and creativity. As can be seen respondents became more experienced with the process over time. However, the effect on originality was much larger than the effect on appropriateness, reflecting the learning requirements of the divergent thinking technique.

Table 10.17: The Effect of Past Campaign Information on Independently Assessed Originality, Appropriateness, and Creativity

Past Campaign	Indep. Assessed ZOrig Pr > F 0.002	Indep. Assessed ZAprro. Not Sign	Indep. Assessed ZCreative Not Sign
No	0.12		
Yes	-0.10		
	Pr > F 0.03	Not Sign	Not Sign
No	0.33		
Yes	0.17		

In relation to the past campaign information, the only significant effect was a reduction in assessed originality when past campaign information was provided. This result was expected as past campaign information when primed should result in mental set fixation, or stringent problem definition, which reduces the originality of

responses. It must be noted that as past campaign information is involved in an interaction effect more detailed analysis of that effect needs analysis in order to understand the various effects.

Table 10.18: The Effect of Area and Country on Independently Assessed Originality, Appropriateness, and Creativity

Area	Indep. Assessed ZOrig Pr > F <0.0001	Indep. Assessed ZAppro. Pr > F <0.0001	Indep. Assessed ZCreative Pr > F <0.0001
Account	0.09	0.44	0.72
Creative	0.58	0.33	1.23
Foreign Student	-0.72	-0.87	-0.75
Domestic Student	0.09	0.12	0.34
Country – W/O For Students	Not Sig	Pr > F 0.004	Pr > F 0.08
U.S./N.Z.		0.43	0.89
France		0.16	0.60

Next the effects of area, as well as the effect of providing country information was assessed. As can be seen in table 10.18 above, account and domestic students had similar judged ratings of originality while foreign students rated very poorly and creatives very highly. For appropriateness, as expected, account people rated the strongest, followed by creatives, domestic, and foreign students respectively. For creativity, creatives rated strongest followed by account people, domestic and then foreign students. The country effect was run on the sample groups without the foreign students. This is due to the fact that for the foreign student group both the NZ and French consumers used in the experiment are to them foreign consumers. The results show a negative effect for appropriateness and creativity given a foreign target market group. However again it must be noted that as area is involved in interaction effects so more detailed analysis is required.

10.7 Two Way Interaction Effects

Carrying on from the last of the one way effects the two way effect of country information by area on creativity is given below in table 10.19. When the country effect was broken down by sample group it is interesting to note that the originality scores of creatives only changed marginally, while those for the account people and domestic students dropped dramatically.

Table 10.19: The Effect of Country by Area on Independently Assessed Creativity

Country	Area	LSMean Pr > F 0.020	Country	LSMean	Change
U.S./N.Z.	Account	1.00	France	0.45	-0.55
U.S./N.Z.	Creative	1.26	France	1.20	-0.06
U.S./N.Z.	Foreign Student	-1.02	France	-0.49	0.53
U.S./N.Z.	Domestic Student	0.49	France	0.19	-0.30

Table 10.20: Effect of Divergent Thinking Techniques and Information on a Past Campaign on Assessed Originality

Technique	Past Campaign	LSMeans With For. Stu. Pr>F 0.01	LSMeans Without For. Stu. Pr>F 0.0009
No	No	0.19	0.39
No	Yes	-0.20	-0.04
Yes	No	0.05	0.27
Yes	Yes	0.003	0.37

As seen from table 10.20 above, for the 'All Sample' data, the no technique and no campaign treatment resulted in the most original responses. The least original responses came with no technique but past campaign information. When a technique

was added this increased the originality of responses over no effects but had a negative effect when added with the past campaign information.

These results changed when the foreign student group was removed from the analysis. Without the foreign students the originality of the work was also at its highest in the no technique/no past campaign treatment but the technique and past campaign treatment was at a similarly high level. It would appear that over all the sample groups that the best originality will occur without any technique or past campaign information, however given the changes that resulted by excluding the foreign students, the technique and campaign effects can only be made clear through an analysis of their effects on each of the different sample groups.

Table 10.21: The Effect of Divergent Thinking Techniques by Area on Independently Assessed Originality

Technique Pr>F 0.0002	Area	Indep. Assessed ZOrig LSMean	Technique	Indep. Assessed ZOrig LSMean	Change
No	Account	-0.12	Yes	0.29	0.41
No	Creative	0.69	Yes	0.46	-0.23
No	Foreign Student	-0.57	Yes	-0.87	-0.29
No	Domestic Student	-0.03	Yes	0.22	0.25

As can be seen in table 10.21 above the account people and domestic students who had the divergent thinking technique did better than those account people and domestic students who did not. For creatives and foreign students the opposite effect occurred. The reasons for creatives poor performance with the creative thinking technique is probably attributable to the fact that they know techniques that are better than the one provided in the experiment. In the case of the foreign students it is likely that they found the divergent thinking task too difficult as their memory resources were being used to make sense of the exercise itself.

Table 10.22 below shows the effect that information on a past campaign had on appropriateness. As can be seen for account executives and foreign students it was a negative effect, with a positive effect occurring for creatives and domestic students.

Table 10.22: The Effect of Information on a Past Campaign by Area on Independently Assessed Appropriateness

Past Campaign Pr > F 0.003	Area/Sample Group	Indep. Assessed Appro LSMean	Past Campaign	Indep. Assessed Appro LSMean	Change
No	Account	0.57	Yes	0.31	-0.26
No	Creative	0.19	Yes	0.48	0.29
No	Foreign Student	-0.76	Yes	-0.99	-0.23
No	Domestic Student	0.03	Yes	0.22	0.19

Table 10.23 shows the effect country information by area on assessed appropriateness. As can be seen foreign target market information had a negative influence on the appropriateness of all the target groups except for the foreign students.

Table 10.23: The Effect of Country by Area on Independently Assessed Appropriateness

Country Pr > F <0.0001	Area/Sample Group	Indep. Assessed Appro LSMean	Country	Indep. Assessed Appro LSMean	Change
U.S./N.Z.	Account	0.64	France	0.24	-0.40
U.S./N.Z.	Creative	0.41	France	0.26	-0.15
U.S./N.Z.	Foreign Student	-1.13	France	-0.61	0.52
U.S./N.Z.	Domestic Student	0.23	France	0.01	-0.22

Table 10.24 shows the effect of past campaign information by area on assessed creativity. As can be seen for account people the past campaign information had a negative effect on their creativity. For creatives the effect was a significant increase in their creativity score. For the domestic student the effect was also positive.

Table 10.24: The Effect of Past Campaign by Area on Independently Assessed Creativity

Past Campaign Pr > F 0.03	Area/Sample Group	Indep. Assessed Creat. LSMean	Past Campaign	Indep. Assessed Creat. LSMean	Change
No	Account	0.90	Yes	0.55	-0.35
No	Creative	0.89	Yes	1.57	0.68
No	Foreign Student	-0.73	Yes	-0.78	-0.05
No	Domestic Student	0.26	Yes	0.43	0.17

Table 10.25 illustrates the three way interaction effect of divergent thinking technique, past campaign information by area on judged creativity scores. As can be seen past campaign information had a large negative effect on the account people, and an even larger positive effect for the creatives. Domestic students also did more creative work with the past campaign information, while the influence on foreign students was minimal.

Table 10.25: The Effect of Divergent Techniques and Past Campaign by Area on Independently Assessed Creativity

Technique	Past Campaign	Area	LSMean
No	No	Account	1.17
No	Yes	Account	0.18
Yes	No	Account	0.63
Yes	Yes	Account	0.91
No	No	Creative	1.04
No	Yes	Creative	2.23
Yes	No	Creative	0.73
Yes	Yes	Creative	0.91
No	No	Foreign Student	-0.76
No	Yes	Foreign Student	-0.91
Yes	No	Foreign Student	-0.70
Yes	Yes	Foreign Student	-0.65
No	No	Domestic Student	0.20
No	Yes	Domestic Student	0.70
Yes	No	Domestic Student	0.32
Yes	Yes	Domestic Student	0.16

Next two way interaction effects were analyzed. The first of effect is the effect of order by the treatment level. As can be seen in table 10.26 below, there appears to be a learning effect on originality for the no treatment and three treatment conditions, an effect which is stronger without the foreign student sample.

Table 10.26: The Effect of Order by Associative Word Level on Independently Assessed Originality and Creativity for All Samples and the Samples without the Foreign Students

Associative Word Level	Order	Indep. Assessed ZOrig All Samples Pr > F 0.06	Indep. Assessed ZOrig No For. Stu Pr > F 0.04	Indep. Assessed ZCreat All Samples Pr > F 0.001	Indep. Assessed ZCreat No For. Stu Pr > F 0.002
No	First	-0.17	0.03	0.20	0.54
No	Second	0.01	0.22	0.47	0.86
No	Third	0.13	0.29	0.65	1.09
Close	First	0.08	0.43	0.52	0.86
Close	Second	-0.25	0.08	0.20	0.38
Close	Third	0.04	0.35	0.05	0.37
Moderate	First	-0.32	-0.15	-0.40	-0.38
Moderate	Second	0.23	0.48	0.63	1.07
Moderate	Third	0.09	0.47	0.56	0.91
Distant	First	-0.18	0.15	0.26	0.44
Distant	Second	0.14	0.25	-0.10	0.15
Distant	Third	0.47	0.81	1.46	1.98

Table 10.27: The Effect of Past Campaign by the Associative Word Level on Independently Assessed Originality for All Samples and the Samples without the Foreign Students

Associative Word Level	Past Campaign	Indep. Assessed. ZOrig All Samples Pr > F 0.05	Indep. Assessed Creat. No For. Stu Pr > F 0.01
No	No	0.18	0.39
No	Yes	-0.20	-0.04
Close	No	-0.06	0.24
Close	Yes	-0.02	0.34
Moderate	No	-0.01	0.17
Moderate	Yes	0.01	0.37
Distant	No	0.32	0.53
Distant	Yes	-0.03	0.27

As can be seen from Table 10.27 above, in the no technique group the past campaign information results in less original responses. Under the close and medium word association treatment conditions the past campaign information results in more original responses. In the distant association treatment originality again drops with past campaign information. The results are more pronounced without the foreign student sample although the same effects occur across each of the data sets, and hence results will be discussed for the data without the foreign students.

Table 10.28 shows the effect of treatment level by area on assessed creativity for all samples. Assessed creativity is the only effect shown as this was the only one that was significant at the 90% or above level.

Table 10.28: The Effect of the Different Associative Word Level for the Different Sample Groups by Past Campaign on Assessed Creativity

Associative Word Level Pr> F 0.04	Area/Sample Group	Past Campaign	Indep. Assessed ZCreat
No	Account	No	1.15
No	Account	Yes	0.19
No	Creative	No	0.97
No	Creative	Yes	1.91
No	Foreign Stu	No	-0.66
No	Foreign Stu	Yes	-0.80
No	Domestic Stu	No	0.14
No	Domestic Stu	Yes	0.63
Close	Account	No	0.34
Close	Account	Yes	1.20
Close	Creative	No	0.53
Close	Creative	Yes	0.61
Close	Foreign Stu	No	-0.57
Close	Foreign Stu	Yes	-0.60
Close	Domestic Stu	No	0.59
Close	Domestic Stu	Yes	-0.07
Moderate	Account	No	0.03
Moderate	Account	Yes	0.86
Moderate	Creative	No	0.88
Moderate	Creative	Yes	1.08
Moderate	Foreign Stu	No	-0.46
Moderate	Foreign Stu	Yes	-0.65
Moderate	Domestic Stu	No	0.29
Moderate	Domestic Stu	Yes	0.07
Distant	Account	No	1.60
Distant	Account	Yes	0.79

Distant	Creative	No	1.22
Distant	Creative	Yes	0.87
Distant	Foreign Stu	No	-0.43
Distant	Foreign Stu	Yes	-0.42
Distant	Domestic Stu	No	0.61
Distant	Domestic Stu	Yes	0.07

The results shown in this chapter are developed in chapters 12 and 13 and key findings and implications are discussed.

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11.0 Discussion of Primary Effects

11.1 The Negative Self Assessment Bias for Creative Thinking Techniques

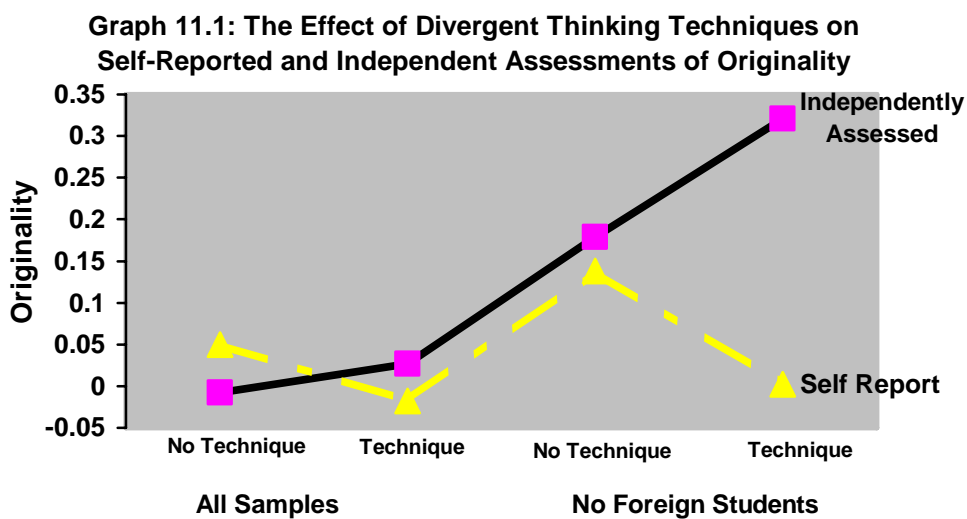
The results from chapter 11 showed a number of main effects in relation to the hypotheses. The first hypothesis related to whether there was a negative self assessment bias; as indicated in the pre-test results.

H1 – Self ratings of originality will be lower than independently judged ratings of originality when participants are instructed to use forced divergent thinking techniques.

This hypothesis was assessed by looking at the independent, versus the self assessment measurement results. First the results showing the effect of divergent thinking techniques on self-assessed and independent assessments of originality were analyzed.

11.1.1 Effects of the Divergent Thinking Technique on Self Reported and Independently Judged Originality

Graph 11.1 below shows the self assessed originality and independently judged originality scores without a technique, (0) and with a technique (1). The first four points represent results from the data on all four samples, while the second four points represent the data set that excludes the foreign students. The dashed line represents the self assessments scores and the solid line the independently judged scores.

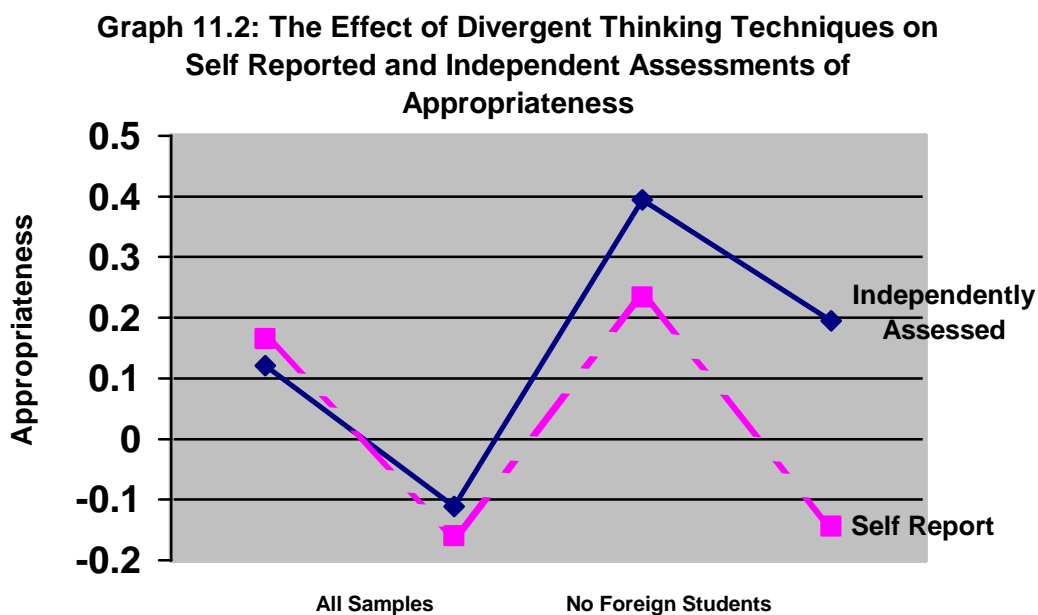


While the pattern of effects is the same across the All Sample data group and the sample excluding the Foreign Students, the independently judged originality results

inclusive of the foreign students were not significant. For the group excluding the foreign students (the last four points on the graph above), the result shows that when respondents were instructed to use a forced divergence technique they rated their own work poorly ($p = .17$), while in contrast independent judges rated that same work as the most original ($p = .07$). Essentially, respondents that used the technique judged their work poorly, while independent judges viewed this work as the most original. This shows a negative self-assessment originality bias against the technique, as per the pre-test.

11.1.2 Effects of the Divergent Thinking Technique on Self Reported and Independently Judged Appropriateness

Next the effect of the divergent thinking technique on assessed and independently judged appropriateness was evaluated. Graph 11.2 below shows the effects for the All Sample data as well as the data without the Foreign Students.



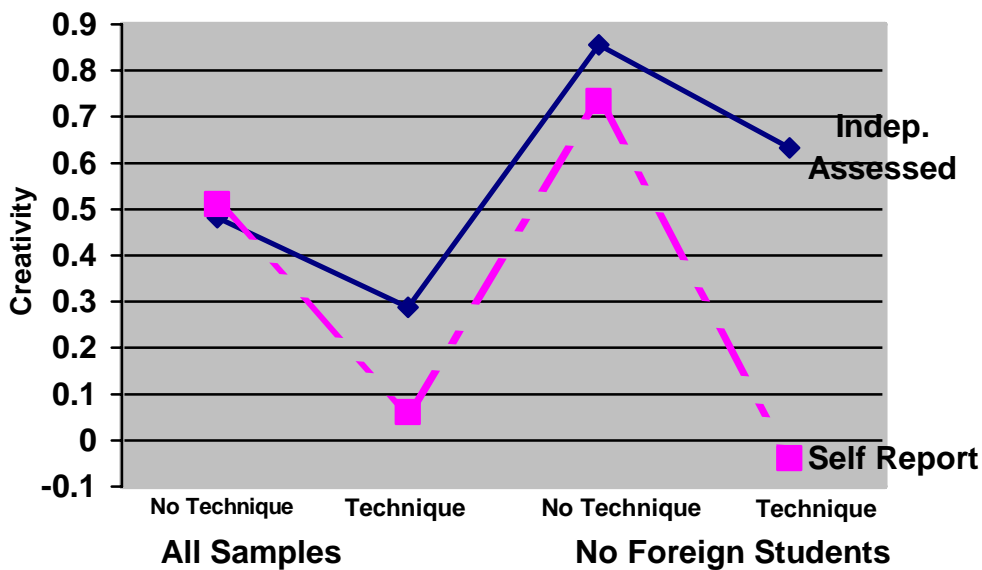
For the appropriateness measure both models were significant ($p < .05$). In both models the group that did not have the technique developed more appropriate work as judged by both the self assessment measure and that of the judges. The use of the creative thinking technique reduced the appropriateness of responses. This result was not unexpected as in the experiment idea refinement would not have had time to occur. The divergent thinking technique will result in cross memory combinations,

and without time to refine those ideas, they will be viewed by both the idea generator and external judges as less appropriate.

Whether those cross domain combinations can be made appropriate, and in what time period, is an area for further analysis. What this results does highlight is that these new, original, cross domain combinations will not initially be viewed as appropriate and without time for idea refinement would be rejected by both the idea generator and others.

11.1.3 Effects of the Divergent Thinking Technique on Self Reported and Independently Judged Creativity

Graph 11.3: The Effect of Divergent Thinking Techniques on Self Reported and Independent Assessments of Creativity

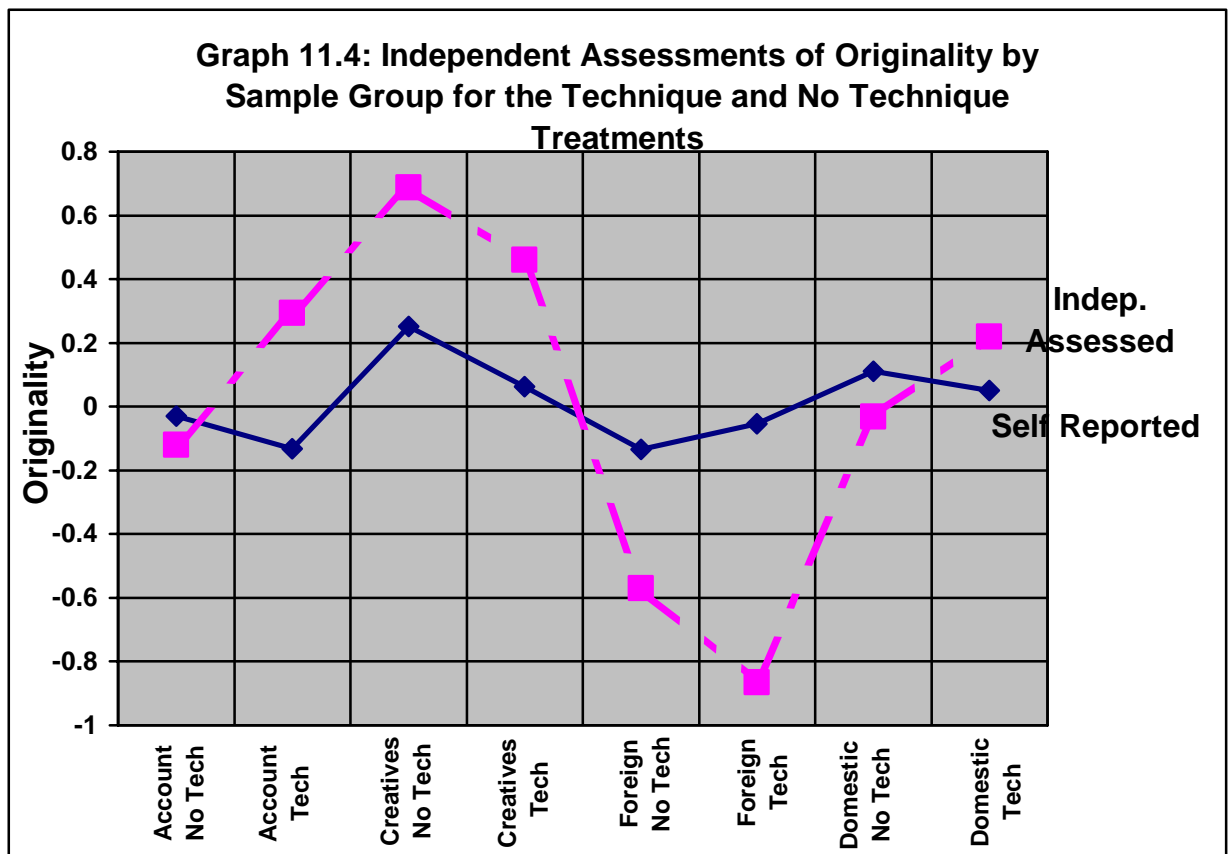


Finally, the effect of the divergent thinking technique on creativity is shown above. For the all sample data the p values are .004 and .013 for the self reported and independently assessed data respectively. For the no foreign student data the p values are < .0001 and .17 respectively. The overall effect of the technique on assessed creativity is a decrease in the score. This would indicate that the negative effect of the technique on appropriateness is stronger than the positive effect of the technique on originality. Of course in some situations to develop highly original ideas is of more value than producing ideas that are appropriate, and therefore should be given more weight. Additionally, the experimental conditions meant the respondent was forced to

focus on idea generation rather than idea refinement processes. Given time it would be expected that the appropriateness scores (both self assessed and independently assessed), would increase as respondents are able to refine their original ideas.

11.1.4 Effects of the Divergent Thinking Technique on Self Reported and Independently Judged Originality for Each of the Sample Groups

Given the relative poor significance levels for the self assessed originality scores, (refer chapter 11) a further analysis of the effects of the technique on originality for each of the different sample groups was undertaken. The results are shown in Graph 11.4 below. The key indicates the different sample group represented by the different bars of the graph. Dom Stu stands for domestic students, For Stu – foreign students, Creative – advertising creatives, and Account – account personnel.



Two effects are interesting to note. First, for the self assessed originality scores for all groups except the foreign students, the first bar; representing the self assessed group that used the divergent thinking technique, is lower than the second bar; representing the self assessed group that did not have a divergent thinking technique, although

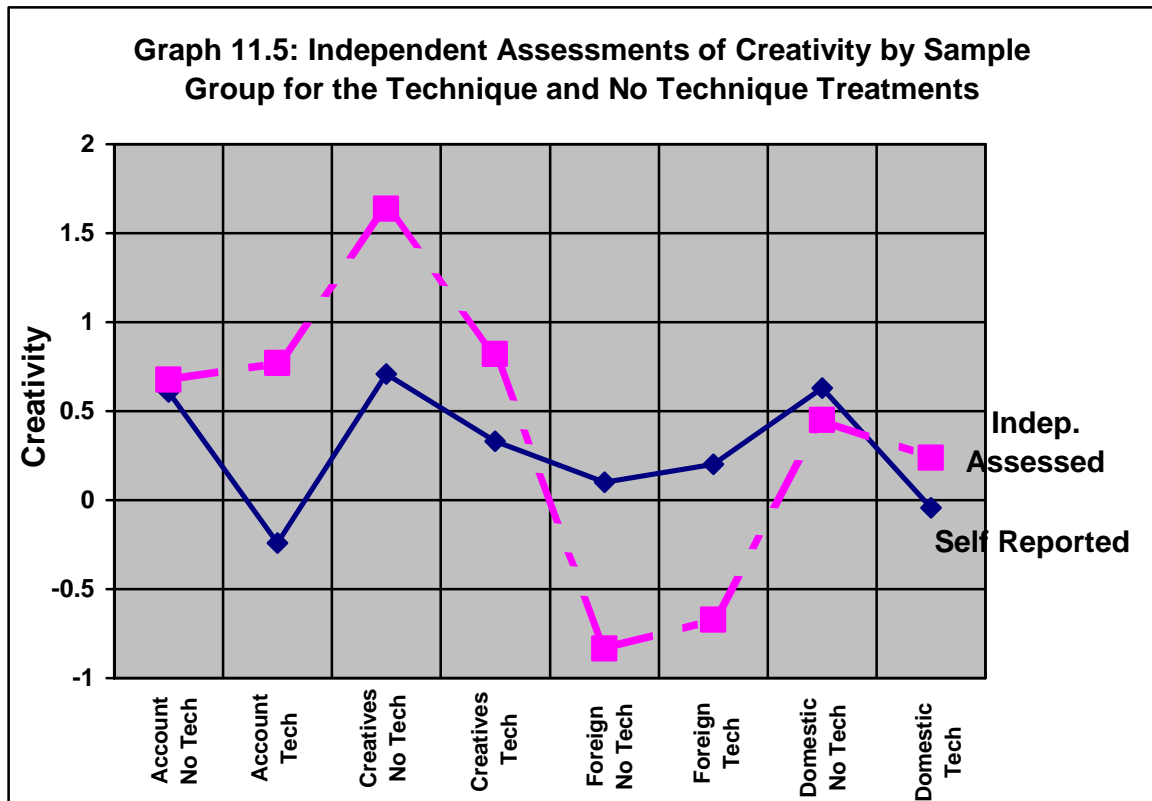
these results are not significant. In other words the self assessment scores were lower for the group that used the forced divergent technique.

In contrast, for the independent assessments of originality ($p < 0.05$) the first bar is higher for the domestic students and account people, although not for the creatives or foreign students. In other words the independent judges viewed the work of the domestic students and account people who had the technique as more original than the work of the groups that did not have the technique, while the opposite was true for their own self assessments. This shows that the negative self assessment originality bias applies to the account people and domestic students.

For the advertising creatives, the group without the technique rated their work as more original than the group that was forced to use the technique and this was supported by the independent judges. As creatives are technique experts and have knowledge, and are skilled, in better techniques than those provided in the experiment, this result is not surprising. For the foreign students the group that made use of the technique thought their work was more original, but the independent judges viewed this work as the least original work.

A possible explanation for the performance of the foreign students is that the use of the associative word forced divergence technique for a person whose memory associations for words in that language are limited, means they are producing combinations that to a first language judge probably appear very basic. For example providing the word 'dangerous' to be used as the combination word for idea development for a fly spray brand might result in: 'a fly spray that is not dangerous to household pets'. For the second language student that may have been a novel combination at an individual level, as they make new connections between ideas in a second language, however the idea will not be viewed as original by the first language judges; to whom this is an obvious and basic (hence unoriginal) solution.

11.1.5 Effects of the Divergent Thinking Technique on Self Reported and Independently Judged Creativity for Each of the Sample Groups



For creativity the results were similar to that of the originality scores and are significant ($p < .05$), with the domestic students and account executives who had the technique, rating their work poorly. The judges rated that same work by the account people as more creative than the no technique group. However, for domestic students they rated the no technique group more creative than the technique group. Therefore the technique had a much stronger negative effect on the domestic student's appropriateness relative to the positive originality effect, than it did for to the account executives who had stronger domain knowledge.

The account executives, possessing extensive appropriateness related domain knowledge, appear to have gained more significantly from the originality brought about by the use of the creative thinking technique. For people with extensive domain specific knowledge the use of the creative thinking technique provides a stronger effect on creativity due to its effect on originality. This support the contention that domain specific knowledge, when combined with creative thinking techniques,

increases creativity. The technique greatly increases their originality without the large negative effect on appropriateness. As per the results for originality, the creatives without the technique scored highest, and the foreign students scored very poorly.

11.1.6 Discussion – Effects of Divergent Thinking Techniques

These results indicate that the use of creative thinking techniques will have differing effects on different sample populations given the complexity of the task and their prior knowledge of creative thinking techniques and domain knowledge. For groups who already know creative thinking techniques, basic associative techniques will not enhance their performance. For groups with low existing knowledge of techniques, even basic techniques used in a limited time period can enhance their originality. However, creative thinking tasks are complex and for sample groups with poor understanding of the domain, or due to other task complexities (i.e. 2nd language), these techniques may merely make a difficult task even more difficult. The results also indicate a negative originality self assessment bias against the use of the technique for the domestic student and account samples.

The differing results for the various groups also point towards an important impact of domain specific knowledge. Account people, who are the domain experts, benefited a great deal in terms of originality from the technique and while the technique did reduce their appropriateness, their creativity score was higher with the technique than without it, indicating a relatively small net negative appropriateness effect. In contrast, the results for the domestic students, who are not domain experts, indicate that the negative effect of the technique on appropriateness outweighed the positive effect on originality. This would support the contention that domain specific knowledge is needed once a cross domain category connection is made in order to make that idea appropriate. The account people had this knowledge and hence their results with the technique were more appropriate than for the domestic student who did not possess this knowledge.

For creatives the technique decreased their originality and creativity scores, but even with the technique their scores were higher than the other sample groups. Creatives were able to come up with better responses without the techniques. This is either due

to knowledge of better techniques than those provided in the experiment or better associative abilities, or both. Creatives are able to jump to distant categories and those categories are more likely to be both more original and (it would appear from the creativity results) more appropriate, than those achieved through the forced divergence technique. So while for other groups the technique was able to take them to more distant categories than they would otherwise have made, for the creatives they were able to achieve this without the technique, and as they were their own, not forced, connections they were able to make more, and stronger, connections between the ideas.

It is contended that the very poor performance of the foreign students may be due to two factors. First the fact that the judges may not rate their responses as creative even though they are creative at an individual level. Second, they had problems undertaking a complex creativity task in a second language. In regards to this second factor the 2nd language students poor knowledge of any alternative domain that was opened by the technique will result in difficulties in making any relevant connections. The technique added another category of information which was also poorly developed and therefore made the complex task more complex. While an occasional student may bring in very distant domain knowledge to develop a very original solution, most of the responses will be connections that to any relative domain expert (i.e. first language judges), very basic connections.

It would appear that in the majority of cases for relevant creative connections between domains to be made sufficient domain specific knowledge is needed of both the original domain and the connecting domain. For second language students these extensive knowledge categories did not exist. If this second reason for the poor performance of the 2nd language group is a factor it would be expected that this sample's language basis would show through in a poor ability to differentiate between the level of associative word.

11.1.7 Hypothesis One – Self Assessment Bias

Hypothesis 1 is given partial support. There appears to be a negative self assessment bias against originality. For appropriateness the technique was assessed by both the respondents and independent judges to have a negative effect on their results.

Given the low predictive ability of the self-assessment data, with R^2 's of the various self-assessment equations being only 0.03, 0.08 and 0.11 for originality, appropriateness and creativity respectively, and the fact that the self assessment scores were only needed to determine if there was a self assessment bias, the independent judgments were used as the basis for the remaining analysis.

11.2 The Effect of the Forced Divergence Technique on Originality and Appropriateness for Novices and Experts

Results were analyzed to determine if hypotheses 2 and 3 were supported or rejected. H2a – Independently judged ratings of originality will be higher for domain novices when they are instructed to use the forced divergent techniques than when they are not.

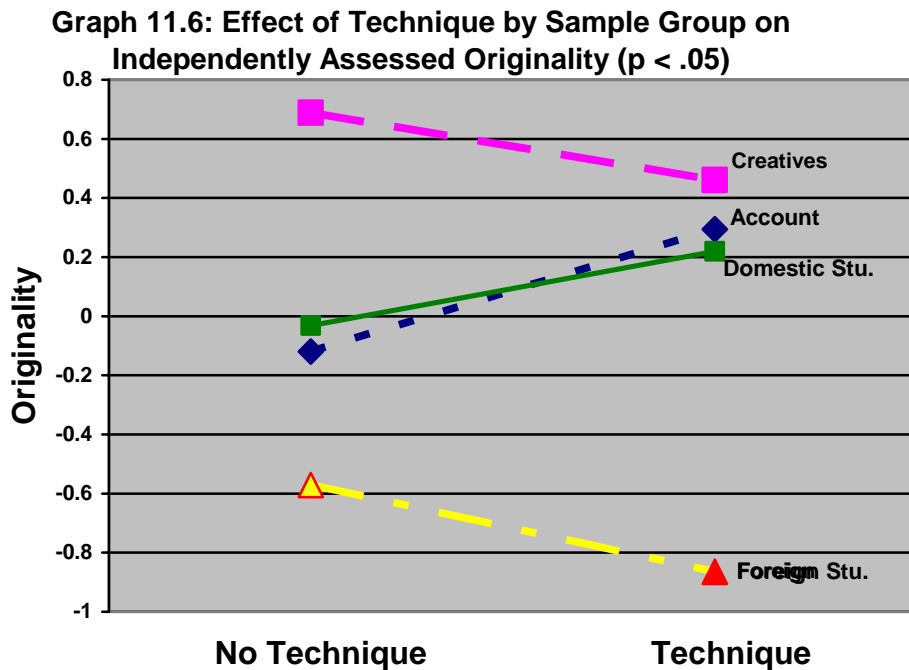
H2b – Independently judged ratings of appropriateness will be lower for domain novices when they are instructed to use the forced divergent techniques than when they are not.

H3a - Independently judged ratings of originality will be lower for technique experts when they are instructed to use the forced divergent techniques than when they are not.

H3b - Independently judged ratings of appropriateness will be lower for technique experts when they are instructed to use the forced divergent techniques than when they are not.

The domestic student sample is the novice sample in relation to the advertising domain, while the creatives are the technique experts. Graph 11.6 below illustrates the effect of the technique on each of the sample groups.

11.2.1 The Effect of the Divergent Technique on Each of the Sample Groups



The creatives and foreign student groups who were provided with the divergent thinking technique did worse than the group without the technique, but with very different levels of originality. The technique made the unoriginal work of the foreign students even more unoriginal. This is likely due to the added difficulty of having to use an associative work to make a connection to the product category in a foreign language.

With limited knowledge of the language, using the associative word is likely to result in second language students providing, what are to domestic judges, more common responses. The less developed category knowledge of the foreign student means that when they are forced to provide a response in the category opened this will result in a response which to judges with more extensive memory categories in that area, is viewed as a basic response. In time a foreign student might be able to use their alternative first language structures to develop a more original response, but under the time limits of the experiment, this does not appear to have been prevalent. A foreign student without the technique will be able to use their basic knowledge of the product category to produce relatively more original work.

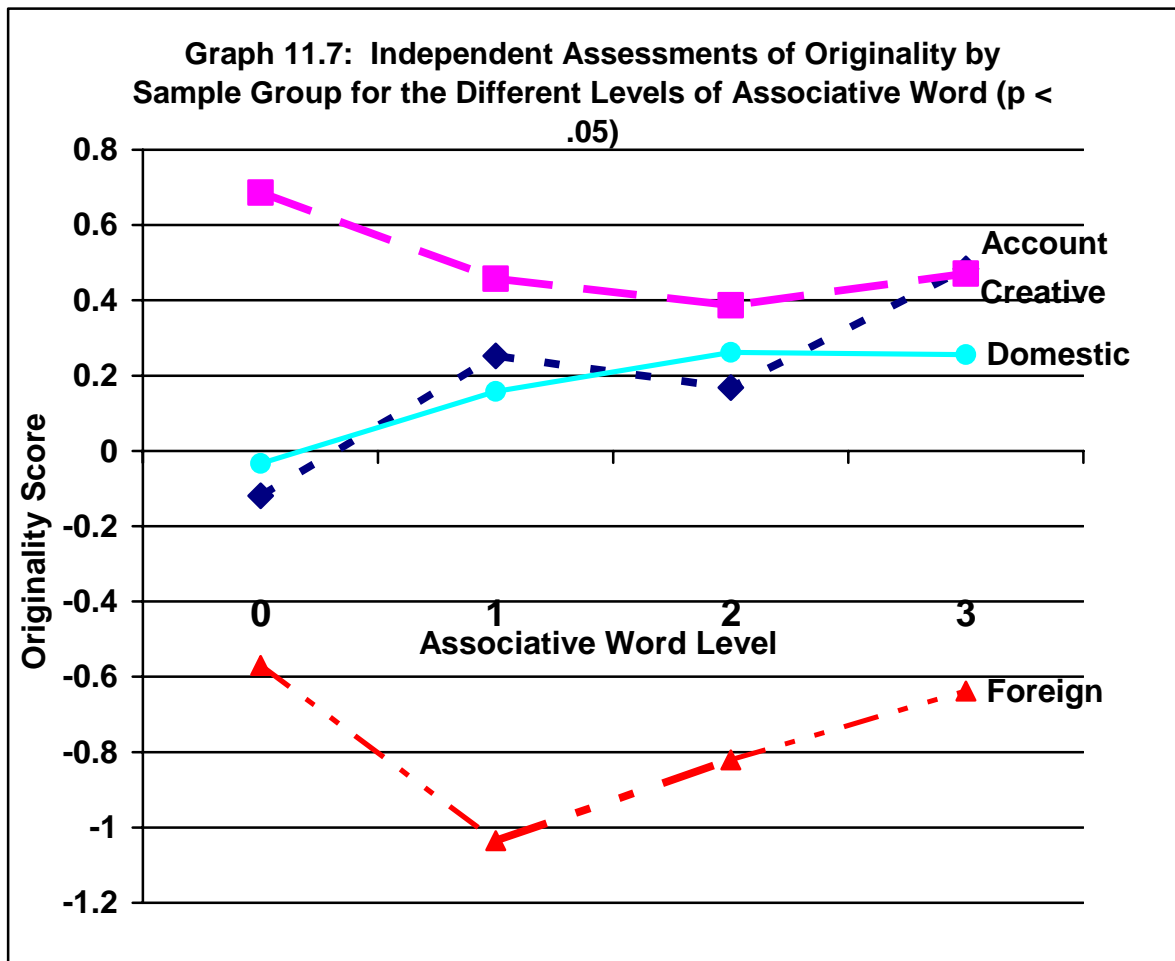
At the other end of the originality spectrum, the creatives produced the most creative work, and developed their best work, without the use of the forced divergence technique. This is due to internal knowledge of better techniques than those provided in the experiment, and/or better associative abilities. For account people and domestic students the technique improved their originality.

11.2.2 Discussion – Effect of Technique for the Different Sample Groups

The technique increased originality for the domain novice and the domain expert, and decreased it for the technique expert. The effect by sample group of the technique on appropriateness was not significant. However, the overall effect of the technique on appropriateness was negative (refer graph 11.2), for both the All Sample data and the data excluding the Foreign Students. Hypothesis two and three are supported. The divergent thinking technique increased originality in the domain novice while decreasing it in the technique expert. Additionally, the effect on appropriateness was negative.

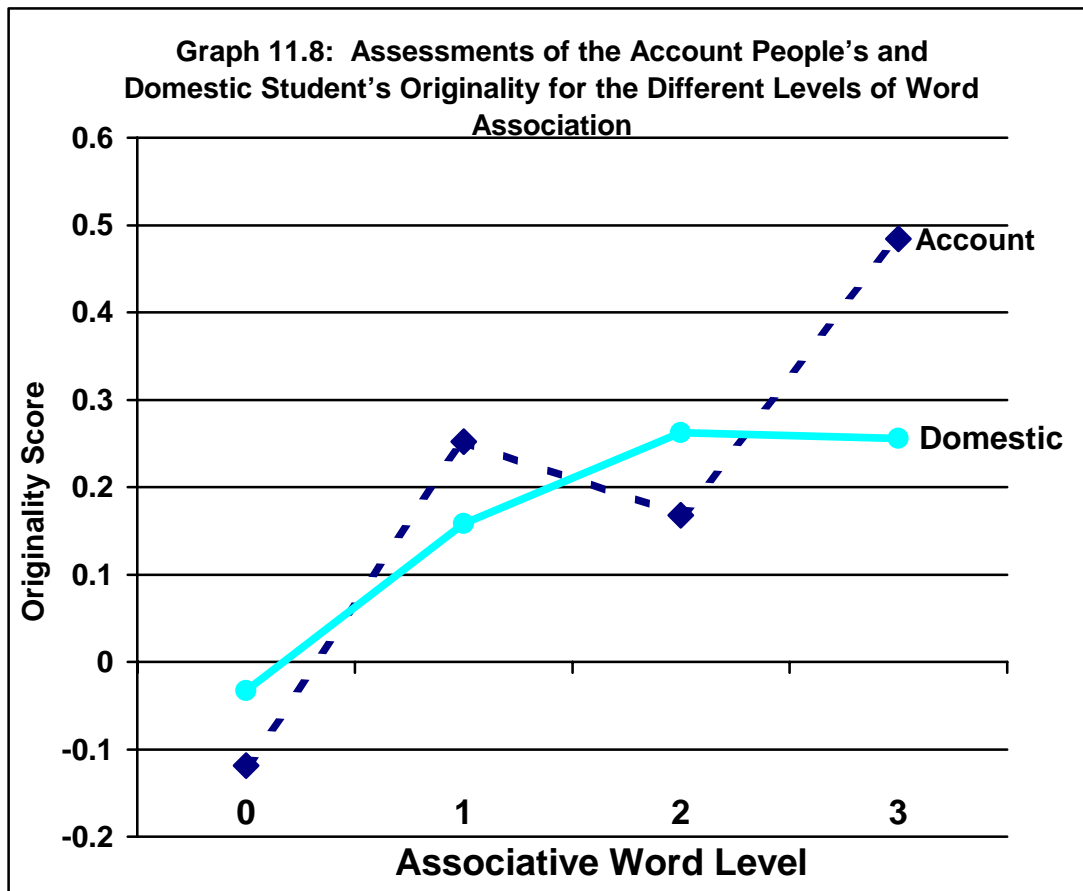
11.3 The Effect of the Divergent Thinking Technique for Each Level of Associative Word on Each Sample Group

Further analysis of the effect of divergent thinking techniques for each of the sample groups was undertaken by looking at the effect on independently assessed originality scores for the different level of associative word used in the divergent thinking treatment. In Graph 11.7 below Dom Stu 0 represents domestic students without the technique, Dom Stu 1 – Domestic students with a closely associated word, Dom Stu 2 – Domestic students with a moderately associated word, and Dom Stu 3 – Domestic students with a distantly associated word. The same format applies to the other sample groups.



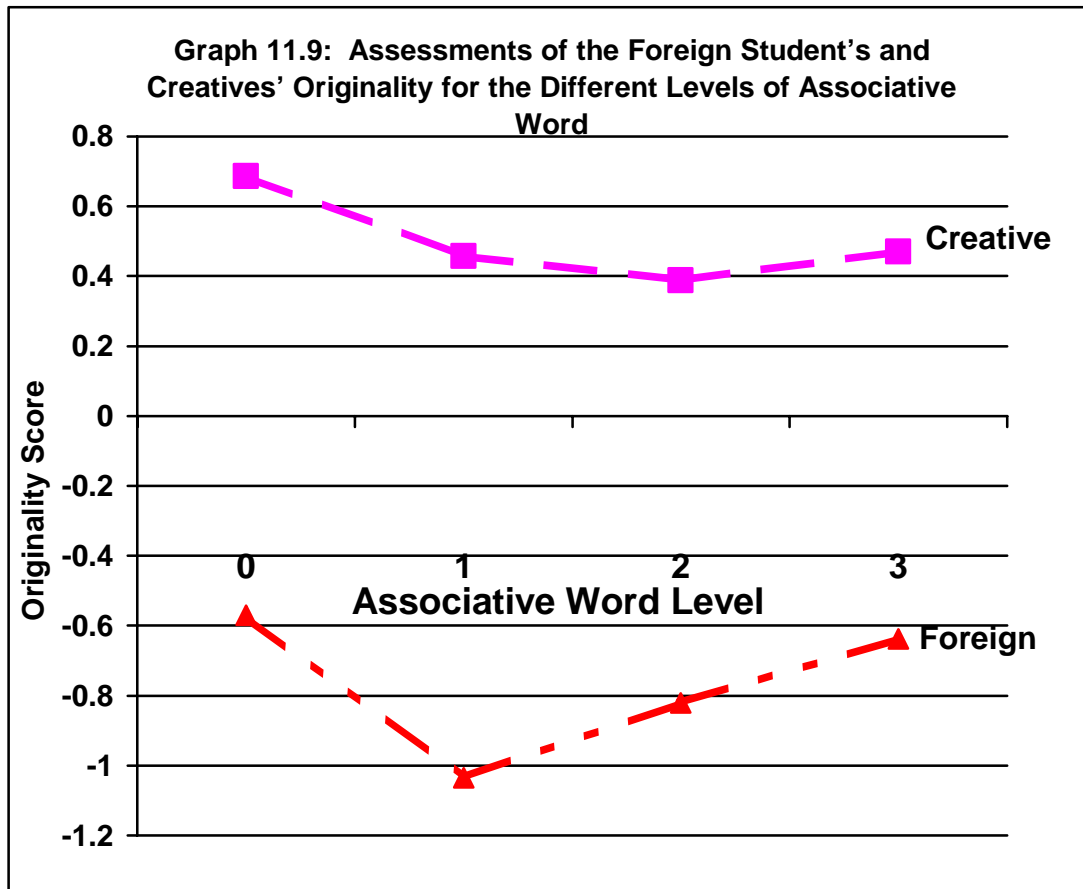
Looking at the overall effects creatives produced the most creative work and foreign students the least creative. Interestingly the account people with the most distantly associated word scored at about the same level as the creatives with the same associated word level. However, creatives without a technique scored higher than this level. This would indicate that there may be a limit to the level of originality that can be achieved with the use of the different divergent thinking techniques used in this experiment, although knowledge of better technique can take you further (i.e. the creatives).

11.3.1 Effect of the Level of Associative Word on Originality Scores for Account People and Domestic Students



Looking at the individual results for the domestic students it can be seen that their least original work occurred in the no technique treatment, while there appears to be a levelling off with little difference in originality for the medium and distantly associated words. For the account people their most original work occurred with the most distantly associated word; and their least original work in the no technique treatment. Overall the effect is that the technique itself, as well as the more distant associations, resulted in more originality, although as the task becomes more complex there may be a maximum effect for each group, based upon their knowledge of the domain and techniques.

11.3.2 Effect of the Level of Associative Word on Originality Scores for Foreign Students and Advertising Creatives

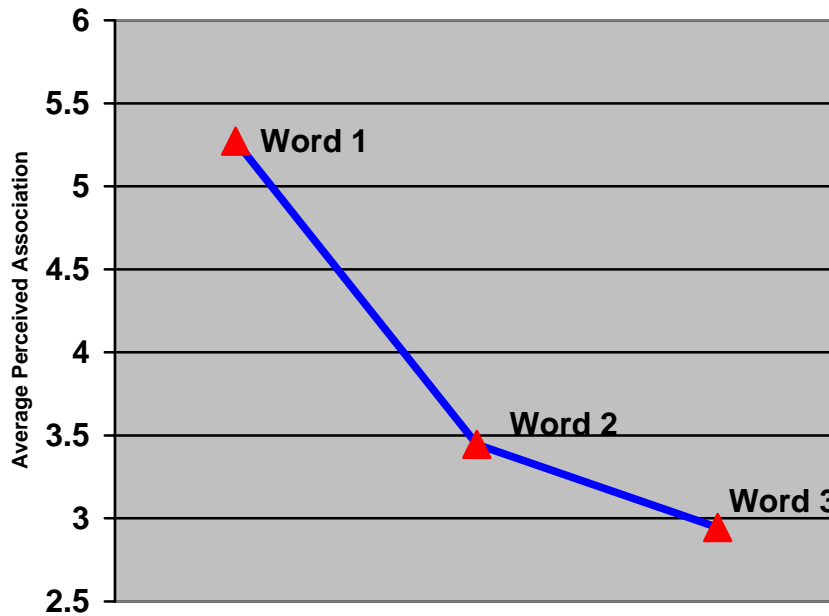


Foreign students had a similar pattern as the previous two graphs, in regards to the effects of the associated words. More distantly associated words resulted in more original responses. However, their most original work occurred in the non technique treatment. So while the more distant association of the word used in the technique treatments resulted in more original responses, originality was still poorer for the groups using the technique than for the baseline, no technique, group. In contrast to the other groups creatives most original work occurred in the no technique condition indicating that they possess better techniques, or cognitive strategies, internally than those provided in the experiment. Additionally the different associative level of the three words used in the technique treatments did not have a large effect on the originality of their responses.

Given the poor results for the foreign students, and the varying impact of the treatment level on the different sample groups, an analysis of the perceived level of association of the three words used in the divergent thinking treatment was undertaken.

11.3.3 Perceived Level of Association Between the Three Associative Words and the Product Category for each of the Sample Groups

Graph 11.10: The Average Percieved Level of Association for the Three Words used, across All Samples ($p < .05$)

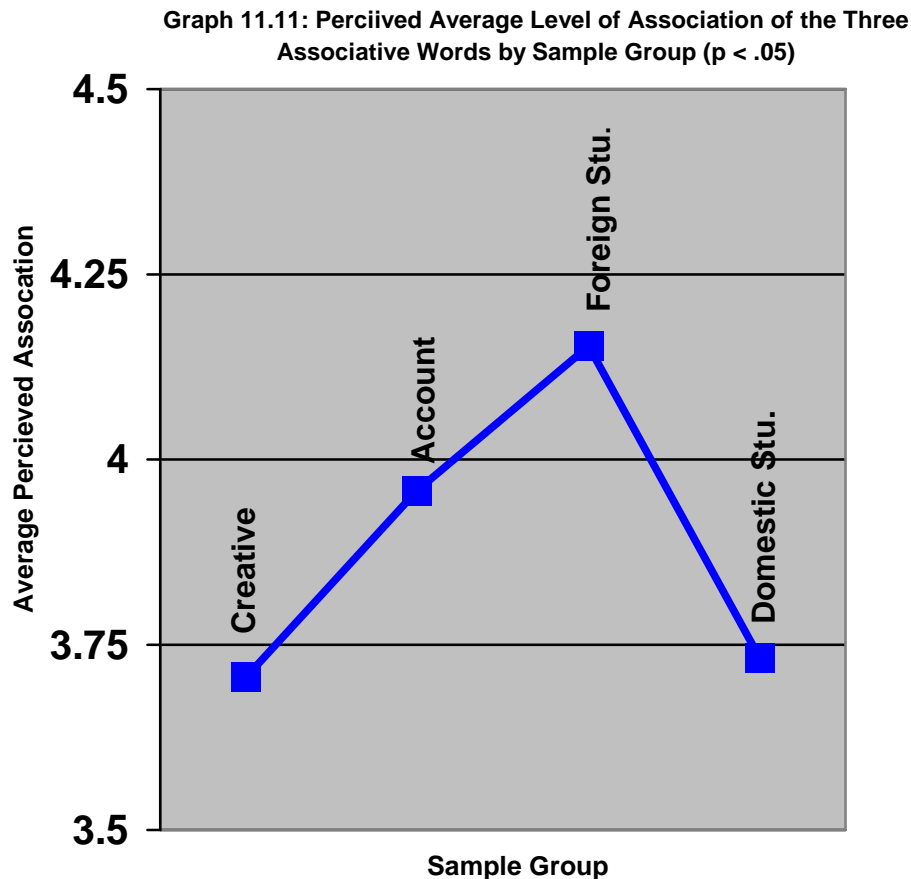


A post test manipulation required respondents to state their level of perceived association between the associative words used and the product category in order to determine if their perceived view reflected that of the researcher. The graph shows the average perceived level of association of each of the three words used. As can be seen, the results show a reduction in the level of perceived association, with word one being the closest perceived associative word and word three the least. However, the perceived difference between words two and three was less than that between one and two.

These results can not show if there are any differences in perception between the different sample populations. This is important as inherent differences in creative abilities have been posited to be due to differences in individual associative hierarchies (Mednick, 1962). Under this theory of individual creativity some people are able to see connections between words or ideas that to others are unrelated. These people have a flatter associative hierarchy. In other words they will see a connection between two distant memory categories where another person would not. They are therefore more able to come up with cross domain memory combinations. An analysis

of perceived associative levels for the different sample populations was therefore undertaken.

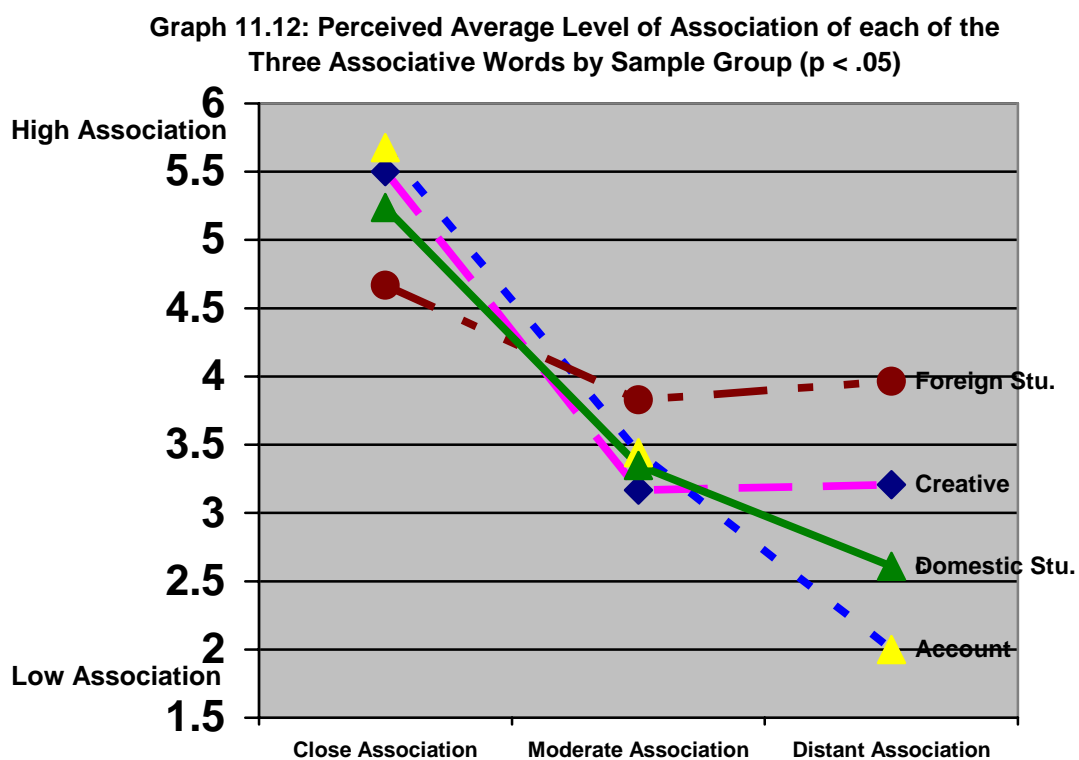
11.3.4 Perceived Average Level of Association for the Three Associative Words for each of the Sample Groups



The graph above illustrates the perceived average level of association of the three words used in the divergent thinking treatment. Creatives' average view of the association between the key words and the product category is the lowest, followed by domestic students, account people, and finally the foreign students. The fact that foreign students do not view any of the words as very closely associated with the product category is an indication of language complexities, and the fact that their memory categories for the English language will not be as well established as the other groups making the task more difficult. For them the weak links between categories will mean that even reading the experimental instructions probably involves a lot more distant memory links.

For creatives their low perception of the difference between the words and the product category may reflect a flatter associative hierarchy (Mednick, 1962). These results are an average across all three words and do not show the associative level for each word individually. Hence, more extreme results for any of the words may average out. Subsequently, the average associative level for each of the three words for each of the sample groups was analyzed.

11.3.5 Perceived Average Level of Association for Each of the Three Associative Words for each of the Sample Groups



Next the level of association between each of the three words was assessed for each of the different sample groups. Account people and domestic students followed the normal expected pattern with each word in turn having a lower perceived level of association, although the account people had the most obvious gradient. For foreign students, while there was a drop off between words one and two, there was no such decrease for the perception of the third word, and the overall decline was relatively minor. This inability to perceive a difference between the words reflects their relatively poorly developed memory categories for English words and contributes to their poor performance in their overall scores across the measures.

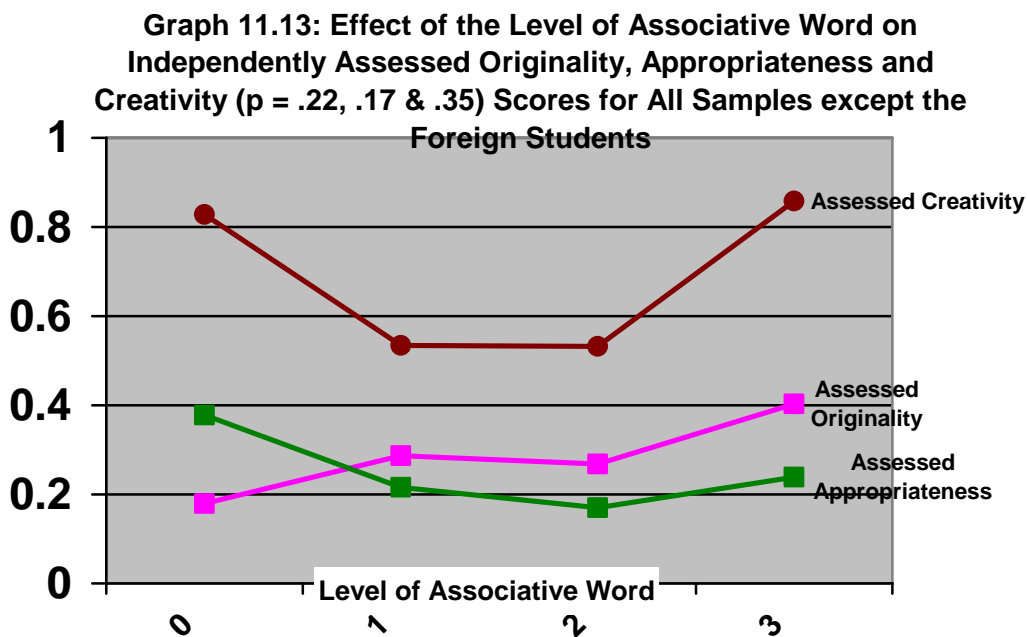
Finally, while creatives indicated a large difference between the level of association between the first and second word, the third word did not result in a continued decline. From the results it is evident that there are different degrees to which people perceive word associations which might account for difference in creative abilities. Domestic students and account personnel have a steeper word associative hierarchy than the creatives. One theory to explain this result is that of Mednick's (1962) remote associative hierarch model.

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.

As per the remote associative hierarchy theory the results indicate that creatives have a flatter associative hierarchy, while account people have the steepest. However, as can be seen in graph 11.8, with the use of divergent thinking techniques account people were able to generate more original responses than domestic students, who have a flatter associative hierarchy. This result for the account people shows that creative thinking techniques appear to replicate the hierarchical ability, and with more complex techniques than those used in this experiment may lead to yet more original responses. This indicates that both inherent abilities and creative thinking techniques are important to creativity, although the relative importance of each is yet to be determined. Indeed, the flatter associative hierarchy effect shown for the creatives may be a result of learning and experience in divergent thinking techniques rather than any inherent ability.

11.3.6 The Effect of Each of the Three Associative Words on Originality, Appropriateness and Creativity

Next an analysis of the effect of the different levels of associative word on originality, appropriateness, and creativity, was undertaken. Given the difficulties the foreign students had with assessing differences between the associative words, the effects for the level of associative word on the three measures excluded that sample group.



There are three points of interest in the above graph. First, as already shown, assessed originality increases with the use of the divergent thinking technique and as the level of associative word increases. Second, while the level of appropriateness drops once a technique is added, there is little effect on appropriateness for the different associative words. Finally, across these three samples creativity is strongest in the group that had the most distantly associated word, although this is only slightly greater than the no technique treatment group. This final result is driven by the strong performance of the creatives without the technique.

11.4 The Effects of Past Information on Originality, Appropriateness for Each of the Sample Groups

Next information on the effect of past campaign information was analyzed in order to test hypotheses 4, 5 and 6.

H4 – Primed domain specific knowledge (i.e. campaign primes) will affect account executives differently than creatives (both domain experts).

Specifically:

H4a – Campaign primes will reduce originality compared to no primes for account executives (creativity technique novices), but not for creatives (creativity technique experts) and,

H4b - Campaign primes will reduce appropriateness compared to no primes for account executives (creativity technique novices), but not for creatives (creativity technique experts)

H5a- Campaign primes will decrease originality compared to no primes for domain novices (e.g, students), but not for domain experts (e.g. executives and creatives).

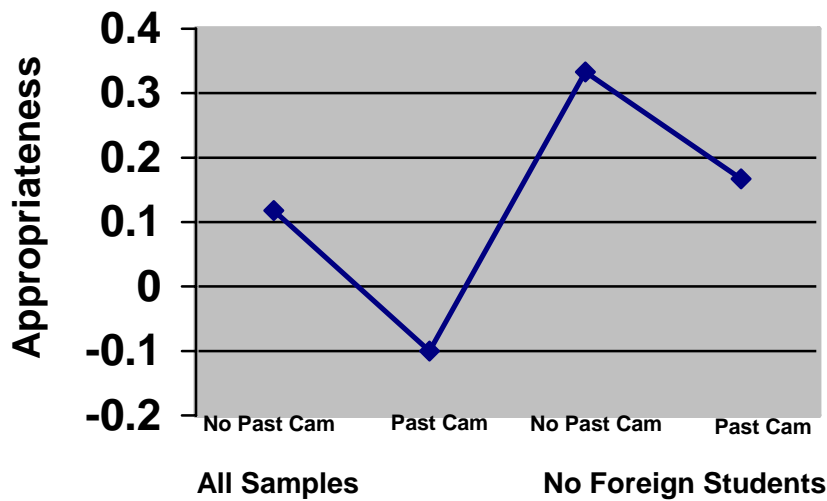
H5b- Campaign primes will increase appropriateness compared to no primes for domain novices (e.g, students), but not for domain experts (e.g., executives and creatives).

H6 – Creative thinking technique experts (e.g. creatives) will generate more original responses than creative thinking technique novices (e.g. students and executives) regardless of primed domain specific knowledge.

These hypothesis were assessed by looking at the effect of the past campaign information on the different sample groups. Account executives are domain experts possessing knowledge of the advertising domain and appropriateness criteria, while domestic students are domain novices. The technique experts are the creatives. First the effect of the past campaign information on appropriateness was analyzed.

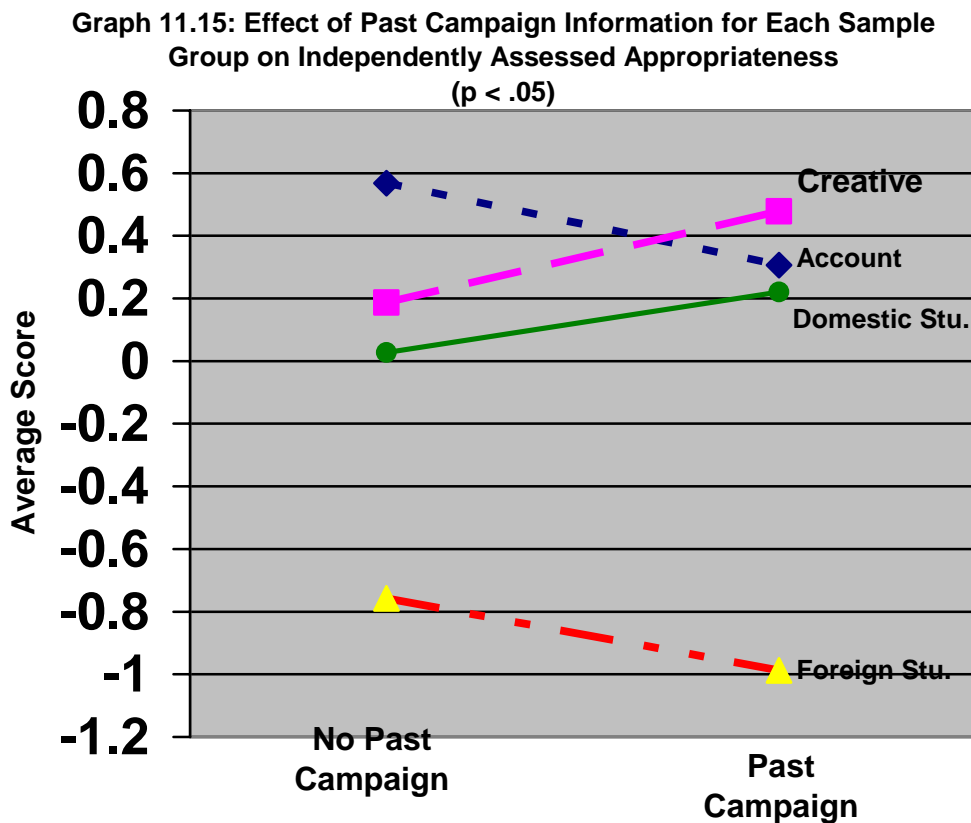
11.4.1 The Effect of Past Campaign Information on Originality

Graph 11.14: The Effect of Past Campaign Information on Independent Assessments of Originality ($p < .05$)



The effect of past campaign information was a reduction on originality for both the data that including the foreign students and the data that excluded the foreign students. This result was expected as past campaign information when primed should result in mental set fixation or stringent problem definition which reduces the originality of responses. This effect appears to relate well to the contention that it is the familiarity of the primed stimuli that determines if it influences the originality of responses. The past campaign information was clearly stated as being related to an unsuccessful campaign so it should not have been used. Despite this, the past campaign information had a marked negative effect on originality pointing toward mental set fixation, or the use of that information in determining the anchor points or problem definition of the respondents.

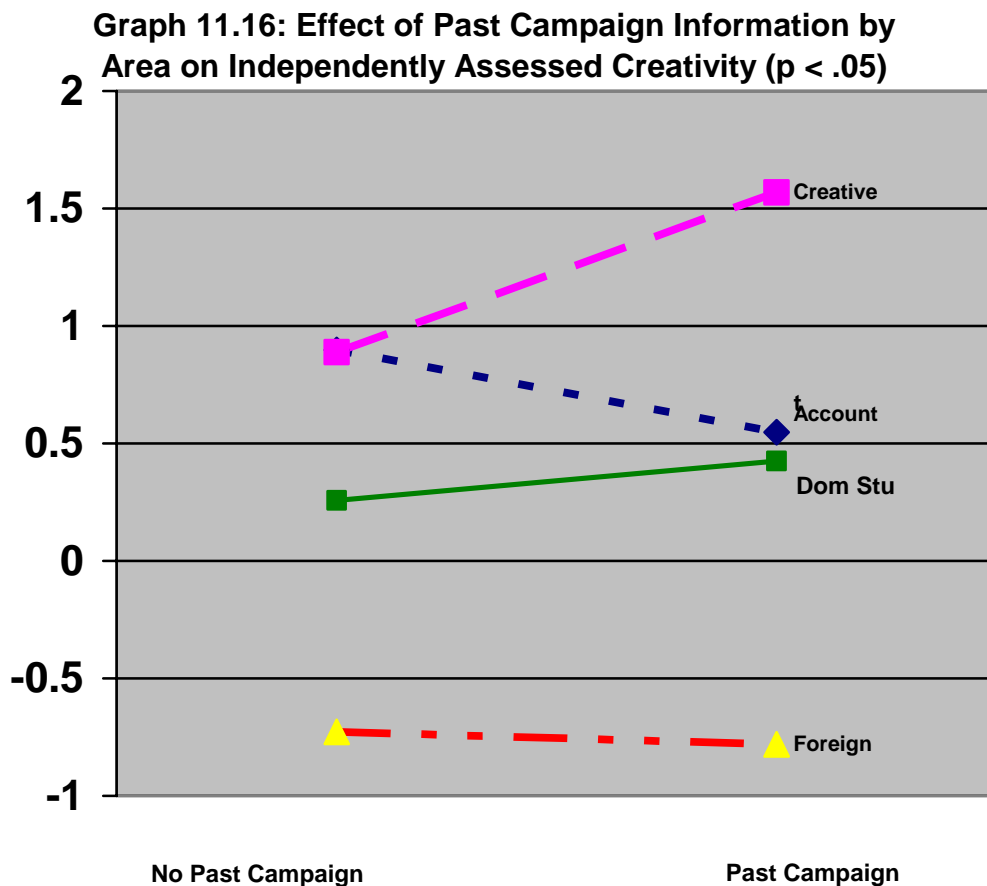
11.4.2 Effect of Past Campaign Information on Appropriateness



The effect of past campaign information on originality and the interaction effect of past campaign by sample group on appropriateness, were significant. However, the effect of past campaign information by sample group on originality was not significant. As can be seen in Graph 11.15 above, past campaign information increased appropriateness for the creatives and domestic students, while it decreased it in account people and foreign students.

Past campaign information reduced the appropriateness of the response in the account executives. For the domain expert their baseline appropriateness is higher than what occurs when past campaign information is used to prime certain information. In other words the past campaign information lead to fixation on less appropriate information that limited both the originality and appropriateness of the response.

11.4.3 Effect of Past Campaign Information on Creativity



The effects of the past campaign information on the different populations creativity is shown in graph 11.16 above. The pattern of results is similar to that shown in Graph 11.15 relating to the effects of the past campaign information on appropriateness by sample group. One difference is for the creatives whose creativity score improved dramatically, far more than could be attributable to the appropriateness component, and indicating that the past campaign information increased their originality scores as well. Combined with earlier results, while past campaign information had a negative effect on originality across all sample groups, it increased the appropriateness and creativity of responses for domestic students and creatives but not for the group that had stronger existing appropriateness knowledge – the account people. Therefore hypotheses 4b, and 5b are supported, however, given the insignificant effects of past campaign information on originality by sample group hypotheses 4a, 5a and 6 are not.

11.4.4 Discussion – The Effect of Past Campaign Information on the Different Sample Groups

Past campaign information had differing effects on appropriateness depending upon the sample groups. It would be expected that despite the fact that respondents were told that the example of the past campaign was unsuccessful for the company (and hence they should not have used it), that for the domain experts (the account executives) the information would prime knowledge that would be used. In this case the domain expert will produce less appropriate work as they are fixated on less appropriate primed knowledge. They will also produce less original responses, as the knowledge they primed leads to mental set fixation and limits cross domain combination processes.

For domestic students, who do not possess the extensive appropriateness knowledge, any primed information would be better than the more inappropriate information they would choose to use without those primes. For creatives the use of divergent thinking techniques meant they were able to avoid fixation and use the past campaign information to develop better overall solutions. For the foreign students the past campaign information just made the task more difficult by opening up another poorly developed memory category.

Therefore it would appear that it is important not to over-structure the question for the domain expert otherwise as it will result in less original and appropriate work. In the novice (the domestic student), the use of past campaign information will lead to a refocus on the correct area and more appropriate responses than they would have had without it. What information is provided to who is therefore critical to the creative process. This result suggests that you can not use a one size fits all strategy when using creative thinking techniques or informational primes. In the next chapter the other main effects are illustrated and discussed.

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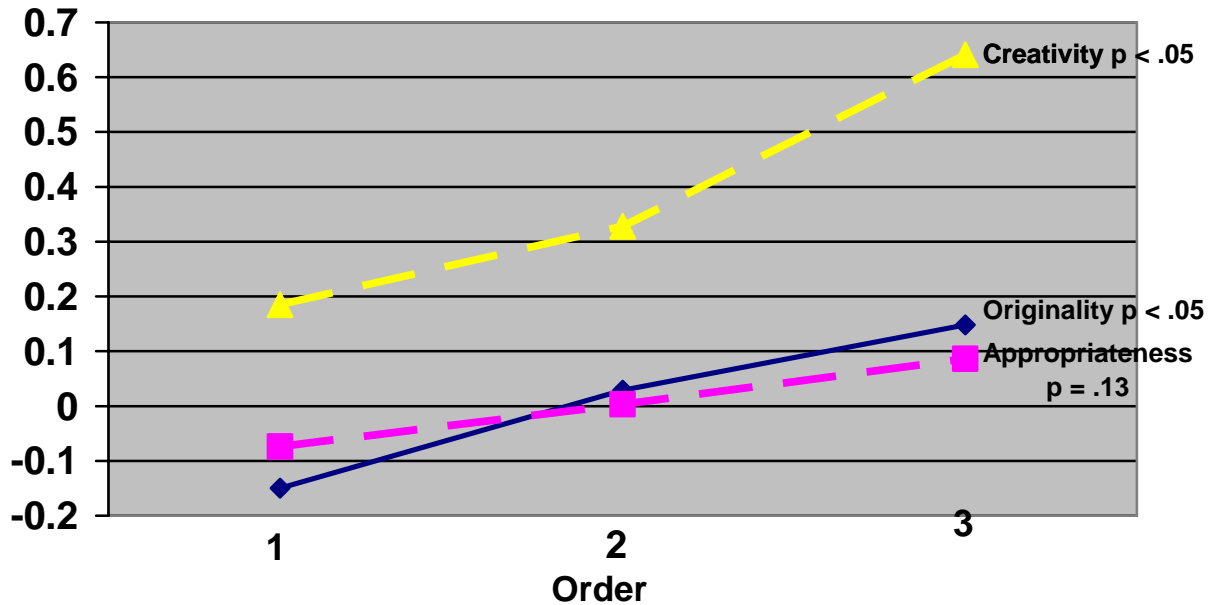
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Chapter 12 – Discussion of the Other Main Effects

12.1 The Order/Learning Effect

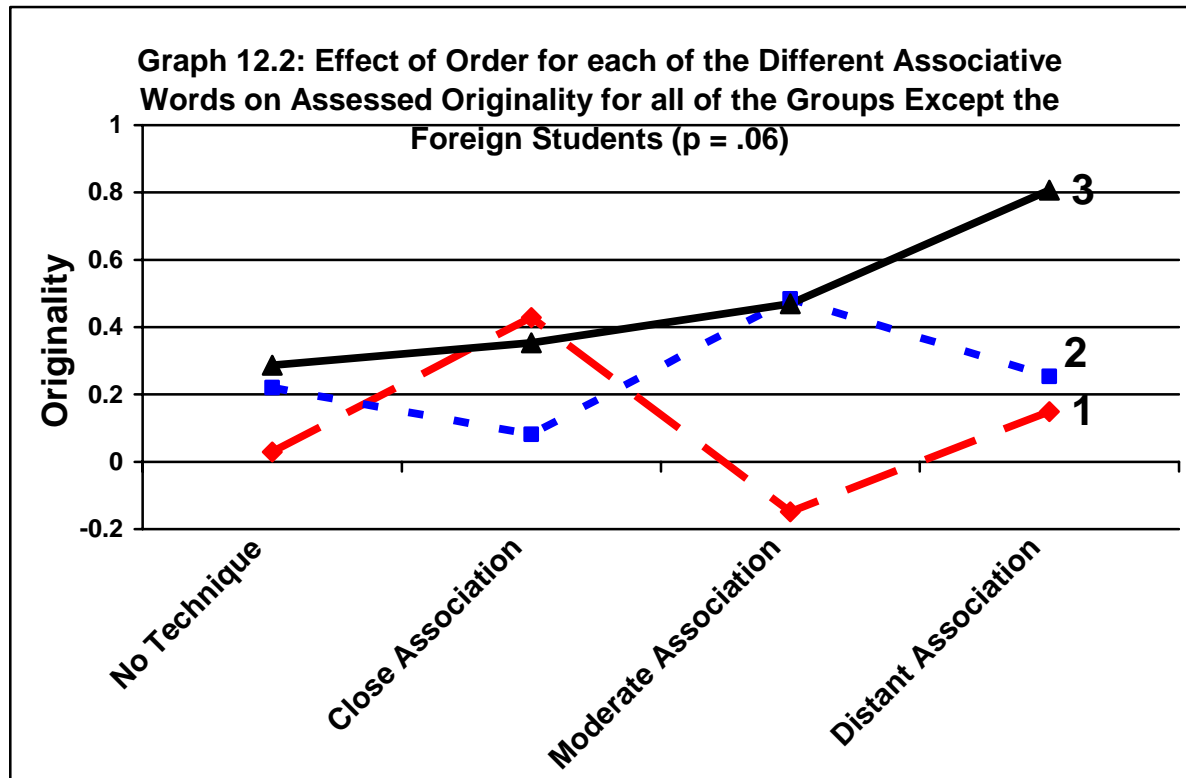
Graph 12.1: The Order Effect



Graph 12.1 above shows an order effect for both originality and appropriateness, which is reflected in the creativity measure. However, the effect on originality was much larger than the effect on appropriateness, reflecting the learning requirements for the divergent thinking technique. Within a period of just one hour respondents are able to more than double their originality through learning effects.

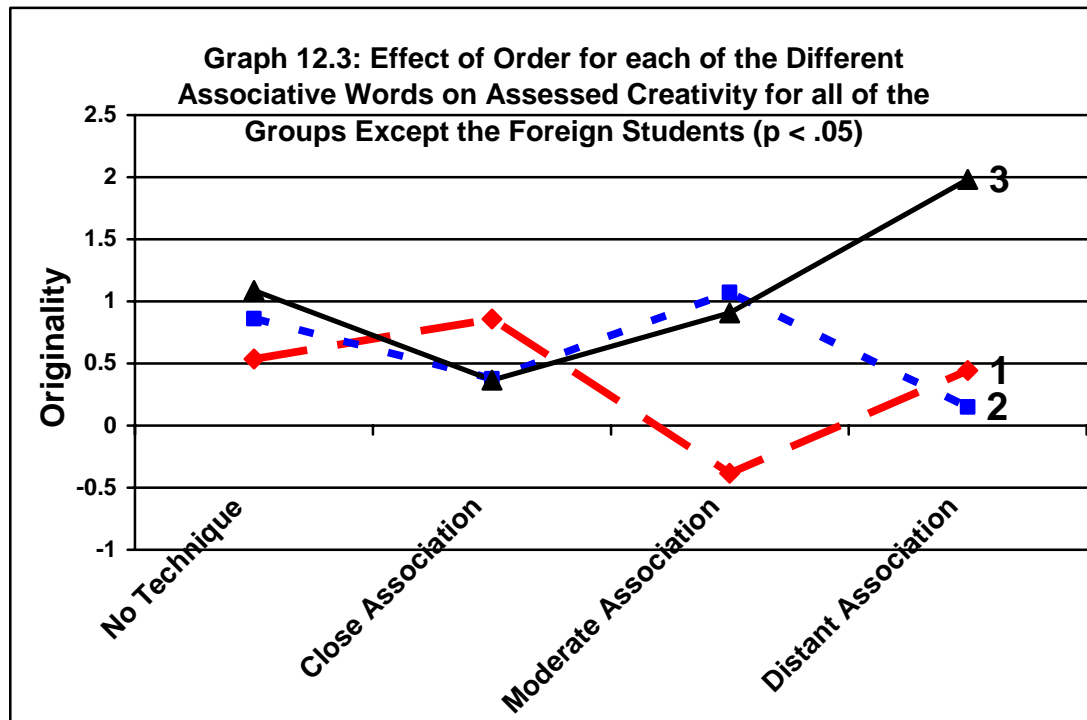
What these results do not show is if this order effect occurs across the different levels of associative word used in the forced divergent technique treatment, or if the results are merely due to improvements in the non divergent thinking technique treatment condition. An analysis of the order effect for the different levels of associative word across sample groups is shown in Graphs 12.2 and 12.3 below. In these graphs the results do not include the foreign student sample data due to their poor ability to differentiate between the associative words (Refer Graph 12.12).

12.1.1 The Learning Effect on Originality for the Different Level of Associative Word



In Graph 12.2 above, there is a learning effect on originality for the no technique treatment and for the medium and distantly associated words. For the closely associated word the respondents did not improve over the order one result when it was given in order 2 or 3, indicating little need to learn the technique for the closely associated word. In the case of the medium associative word, respondents performed poorly if it were the initial word provided and their level of originality was at a similar level in orders 2 and 3 indicating a maximum originality effect. For the distantly associated word, improvements continued as the order increased, illustrating the need to know the technique (or associated cognitive strategy), better in order to apply the distantly associated word. The overall highest score occurred for the distantly associated word/order three condition, indicating both a need to learn the technique for a more difficult word and the large effect on originality once the technique is known.

12.1.2 The Learning Effect on Creativity for the Different Level of Associative Word for each Sample Group



Graph 12.3 shows the effect of the order of the different associative words on creativity. The same general pattern of effects as that shown in the Graph 12.2 for originality assessments can be seen with two notable exceptions. First, the no treatment scores performed relatively stronger. Given the low originality scores for the no technique treatment this means that the appropriateness scores for the no technique treatment were strong. Second, it is interesting to note the very strong performance of the distant associative word in order three and to a lesser extent the strong score of the medium associative word in orders two and three. This strong performance can be contrasted with the much lower originality scores for these two treatment conditions in graph 12.2.

The medium and distantly associative words in order three show very strong levels of creativity, much more than can be attributable to the originality factor. This would indicate that these treatment conditions resulted in responses that are not just more original but also more appropriate. This suggests that due to learning effects, not only does the originality of responses increase with more complex techniques but also the appropriateness of those responses. In other words respondents not only became better

at being able to jump across to distant domains they improved in their ability to quickly make relevant connections between those distant domains and the original domain.

12.1.3 Discussion – Learning Effects

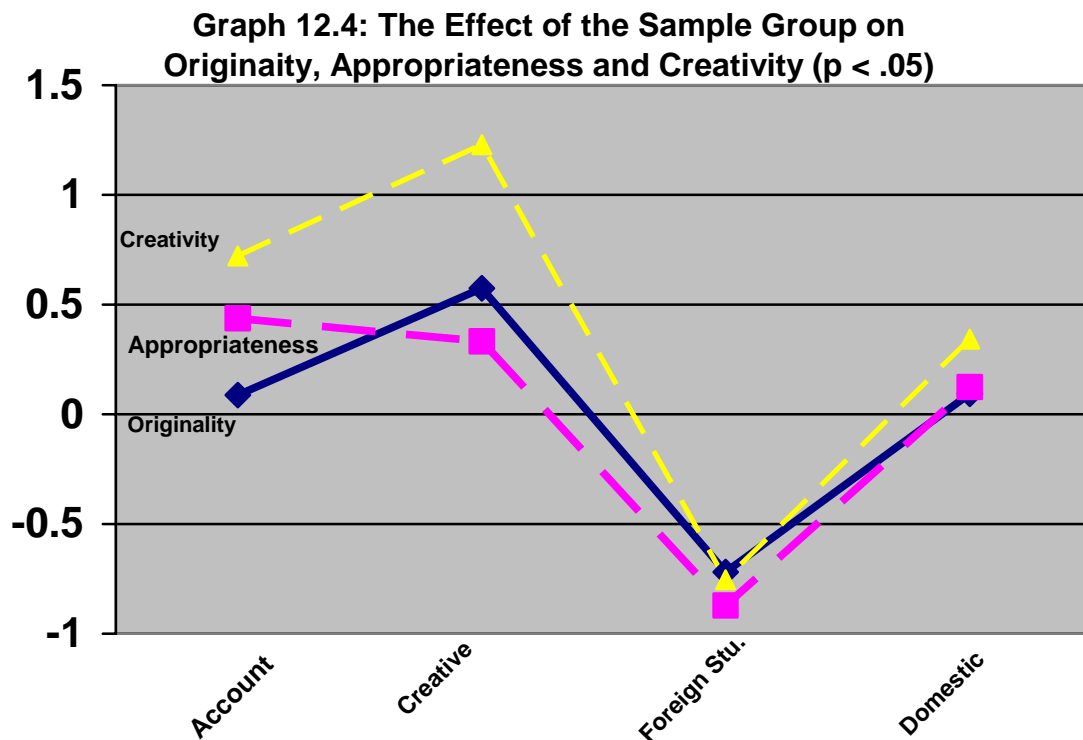
It would appear that it is not difficult to apply simple associative words in creativity tasks but that respondents will benefit from learning the technique when the technique is more difficult. These results support the contention that it is knowledge and experience in associative techniques, or cognitive strategies, which is important when generating original ideas. Once a person learns to apply a cross domain combination strategy they are able to make distant domain connections.

When close and moderately associated words were used there appears to have been a maximum originality and creativity score reached. This also indicates a fixation effect as respondents used the words to come up with related closely associated connections rather than going beyond those memory categories to produce more novel responses.

What is apparent from this research is that even within the short period of time used in this experiment a respondent's ability to refine their distantly associated connections to make them more appropriate increased. Not only were respondents able to learn how to use the technique to cross over to distant domains and develop more original solutions, they were also able to learn how to make those connections more appropriate. This would provide further support to the contention that it is learning and experience in the use of cognitive strategies that is a major contributor to not just originality, but also appropriateness, and hence creativity.

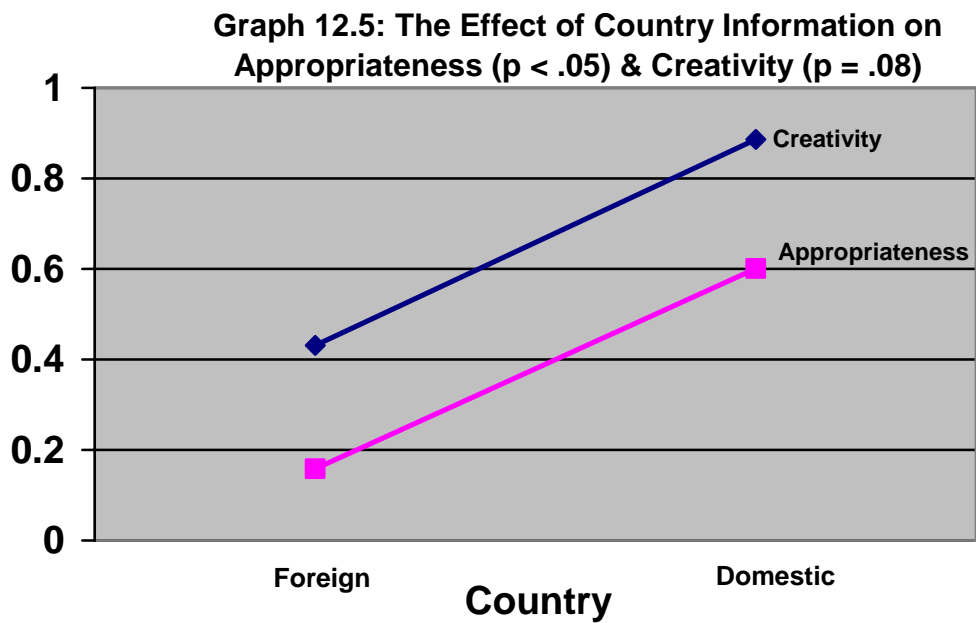
Next originality, appropriateness, and creativity scores for the different sample groups are shown.

12.2 The Effect of Sample Group on Originality, Appropriateness and Creativity



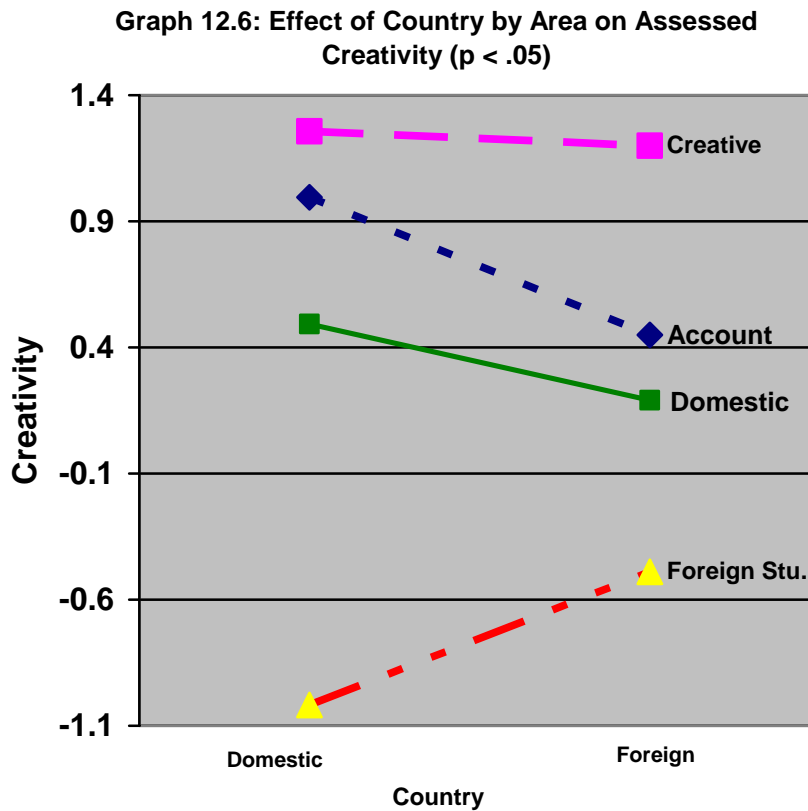
As expected creatives were able to produce the most original and creative work, whilst account executives produced the most appropriate responses. Foreign students had problems with originality, appropriateness and creativity. The results illustrate that existing knowledge has an effect on creativity, and that differing effects dependent upon the nature of that existing knowledge. Strong domain knowledge in relation to appropriateness criteria assisted account executives in their appropriateness, while existing knowledge of creativity techniques assisted the creatives originality. Next the effects of target market country information was analyzed.

12.3 The Effects of Target Market Country Information on Originality



The country effect was run on the sample groups without the foreign students. This is due to the fact that for the foreign student group both the NZ/US and French consumers used in the experiment are to them foreign consumers. The results show, as expected, a negative effect for appropriateness and creativity given a foreign target market group. There was no significant effect of country on originality.

12.3.1 Interaction Effect of Country for Each of the Sample Groups on Creativity



The above graph shows the effect of the country information on each of the sample groups for creativity. For creatives, account executives, and domestic students, the effect of a foreign target market was a reduction in the creativity of their response, however the reduction was only marginal for the creatives, while it more than halved the scores for the domestic students and account executives. The foreign students were the only group that had an increased creativity score with a foreign target market. Of course for the foreign students both target market groups were foreign, and therefore in the eyes of the local judges their work may have been relatively more appropriate than the responses they provided for the domestic consumers.

12.3.2 Discussion – Target Market Country Effects

What is interesting to note was that for the creatives the foreign market information did not result in a large decrease in creativity. This might be due to the fact that their flatter associative hierarchy and knowledge of associative techniques mean they are able to make relevant connections with the new domain that those students and

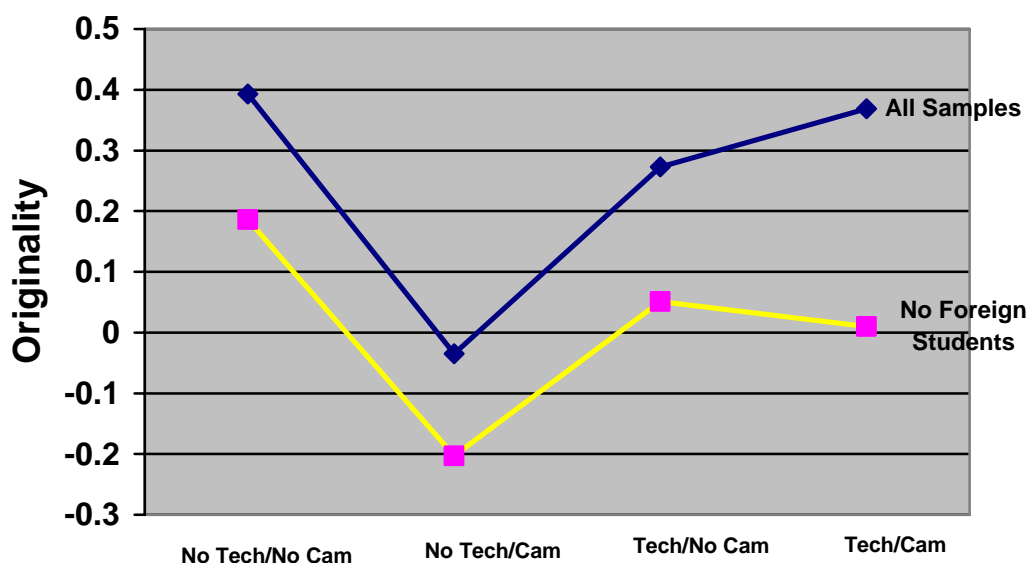
account executives can not. For example they may be able to see a connection between France and the product category (i.e. the fly spray is like a fine wine - it allows you to relax and enjoy the day), that account executives or domestic students could not.

While it was anticipated that foreign target market information would prime distant memory categories and lead to more creative responses the effect was not evident. As was the case with the foreign students group forced to use creative thinking techniques, this may be due to the lack of knowledge of the distant domain meaning that while the respondent crosses to that domain they are then not able to make anything than more basic links between the initial domain and ideas within that new domain.

Further research is needed to determine what the effect would be for an expert in the alternative domain that is primed with that alternative domain information i.e. a advertising novice developing an advertisement that is primed with information for which they are an expert i.e. gardening for a gardener. It would be expected that the expert would need at least a moderate knowledge of the original domain to come up with any appropriate connections.

12.4 The Interaction Effect of Technique and Past Campaign Information on Originality

Graph 12.7: Effect of Technique and Past Campaign Information on Assessed Originality (p < .05)

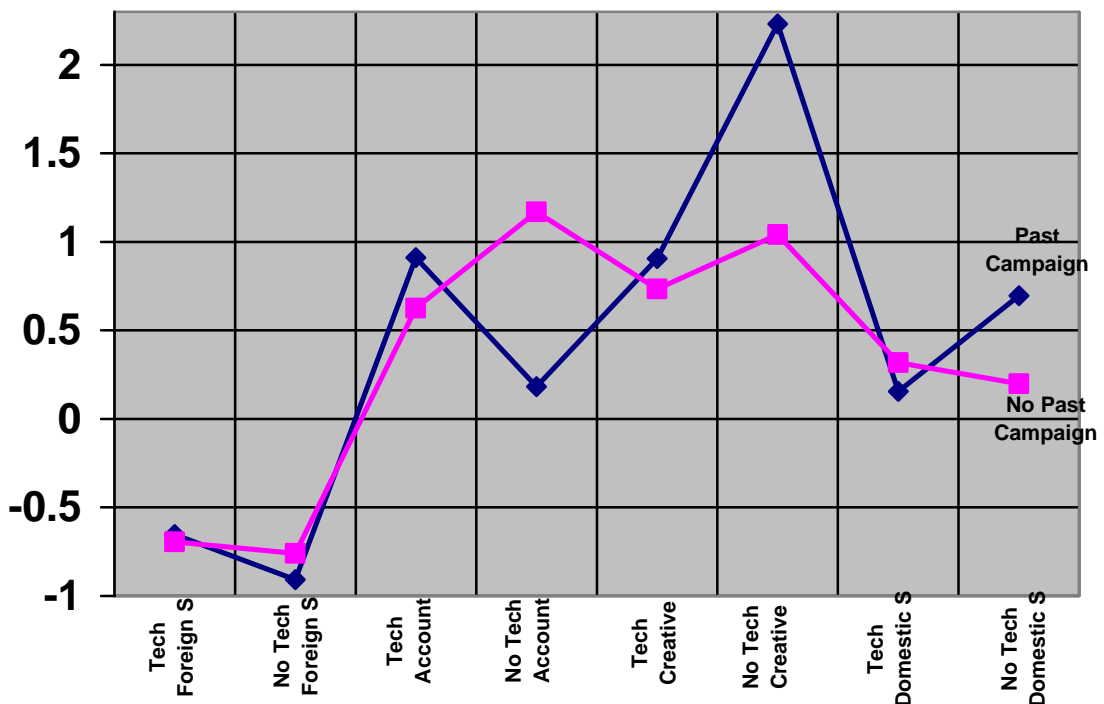


The effect of the divergent thinking technique and past campaign information is

shown for the two data sets: the data including all the samples, and the data without the foreign student. The most original work is done in the no technique/no campaign information treatment when the foreign students are included, but when excluded, while this treatment condition still results in the most original work, the technique/campaign treatment reaches a similar level. The least original work is done in the no technique/campaign treatment. Over the four sample groups the best originality occurs without any technique or past campaign information. These results would suggest that the past campaign information decreases originality, but given the results without the foreign students changed scores to such a large extent, it is evident that the effects differ across different sample groups and therefore this assumption can not be universally applied. An analysis of the interaction effects of the past campaign information and technique is required across each of the sample groups. However, this interaction effect for originality was not significant, so the analysis of the past campaign information/technique interaction effect on creativity was analyzed.

12.4.1 Interaction Effect of Past Campaign Information and Divergent Thinking Technique by Area on Creativity

Graph 12.8: Effect of Past Campaign Information and Divergent Thinking Technique by Area on Assessed Creativity (p < .05)

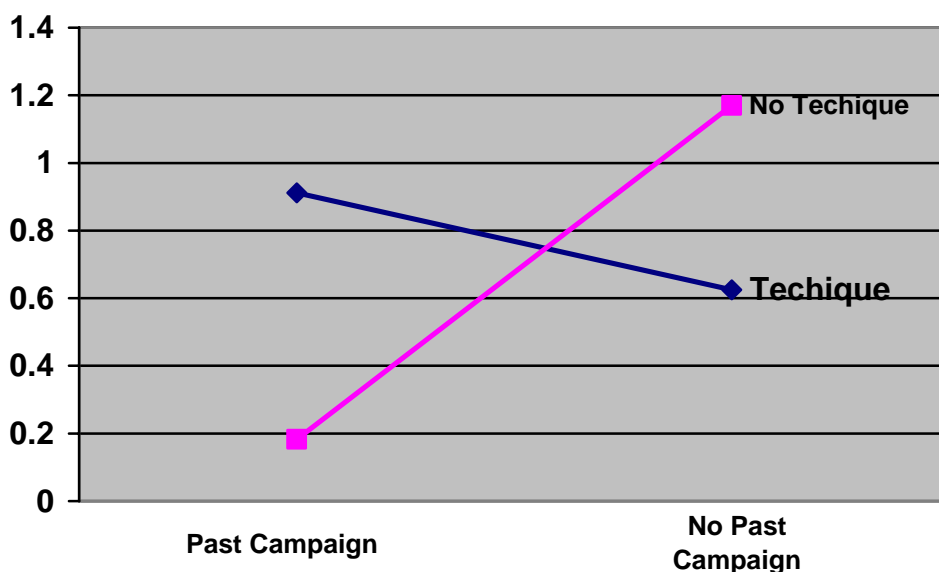


Interestingly with no campaign information or technique it is not the creatives but the account executives who developed the most creative work. However, by far the highest overall score is for creatives who did not have a technique but had past campaign information. So for account executives and domestic students the campaign information without the technique reduced their creativity, while the opposite effect occurred for the creatives. This would suggest that past campaign information did not have the mental set fixation effect for the creatives that it had on the account executives, probably due to their strong existing divergent thinking techniques and/or inherent associative abilities.

In contrast, for the foreign students, neither past campaign information or the provision of a creative thinking technique has a large impact on the creativity of their responses. Their difficulty in undertaking the task itself probably means that developing creative tasks irrespective of the treatment conditions is extremely difficult at best. Domestic students' highest score is with the no technique/past campaign information treatment. These results were analyzed for each of the sample groups.

12.4.1.1 Interaction Effect of Past Campaign Information and Divergent Thinking Technique on Creativity for Account executives

Graph 12.9: The Effect of Past Campaign Information and Divergent Thinking Techniques on Account People's Assessed Creativity

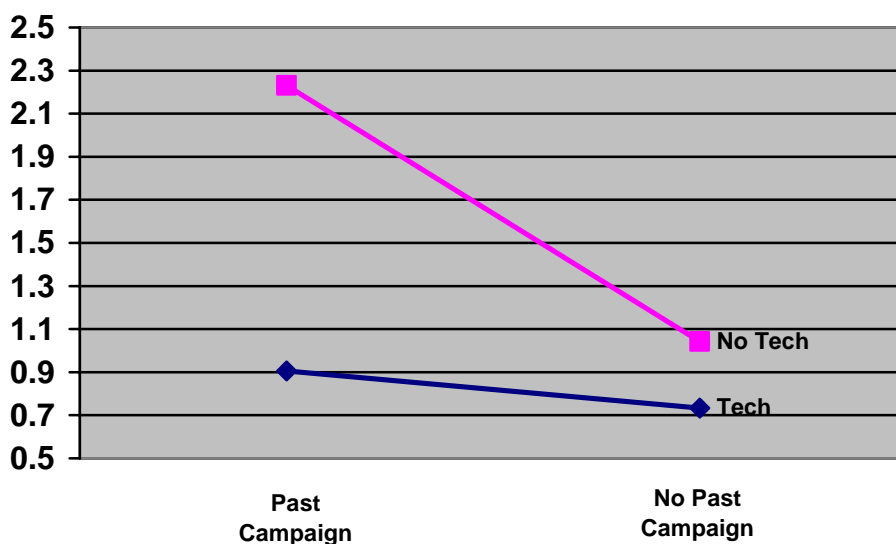


For account executives their most creative work was in the no technique/no campaign treatment while their least creative work occurred in the no technique/past campaign treatment. Past campaign information resulted in mental set fixation which decreased their appropriateness and probably also their originality. For account personnel while the technique increased their originality scores, it had a large negative impact on their appropriateness, and while the campaign information lead to very low levels of creativity, past campaign information combined with the technique allowed them to get out of that mental set fixation and generate more creative ideas than if they had the technique alone.

It would be interesting to see if a longer idea refinement period overcame the appropriateness limitation of the creative thinking technique for account executives. Account personnel outperformed creatives when there was no technique and no campaign and also had a marginally higher level in the technique/campaign treatment.

12.4.1.2 Interaction Effect of Past Campaign Information and Divergent Thinking Technique on Creativity for Creatives

Graph 12.10: The Effect of Past Campaign Information and Divergent Thinking Techniques on Creative's Assessed Creativity

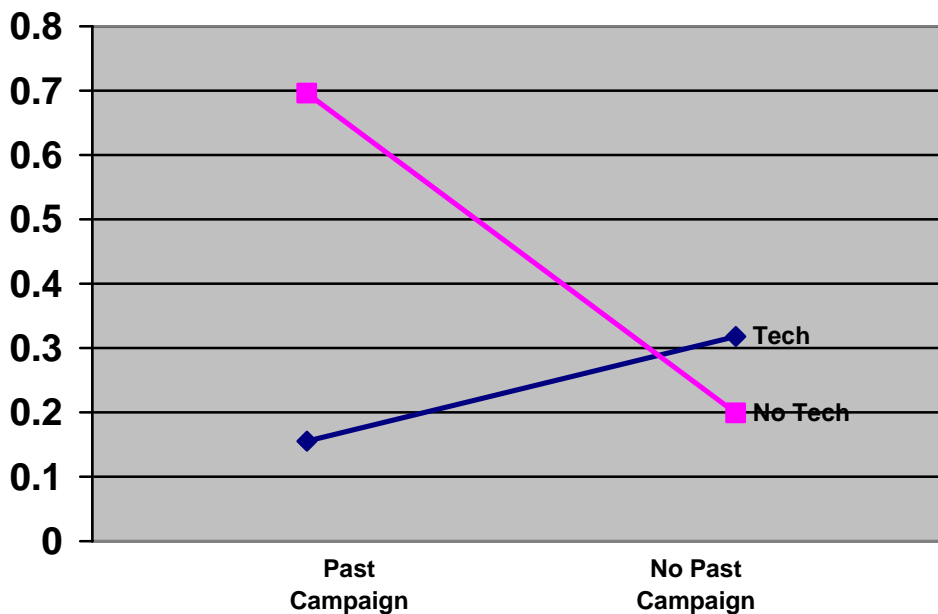


The most creative output across all the sample groups was for creatives without any technique but with past campaign information. Their worst performance occurred when forced to use the technique and with no past campaign information. Adding the

technique to the past campaign information meant adding less appropriate and original combination points than they could have come up with without the technique. Adding the technique to the no campaign treatment had the same effect. For the creatives adding the divergent thinking technique reduced their creativity.

12.4.1.3 Interaction Effect of Past Campaign Information and Divergent Thinking Technique on Creativity for Domestic Students

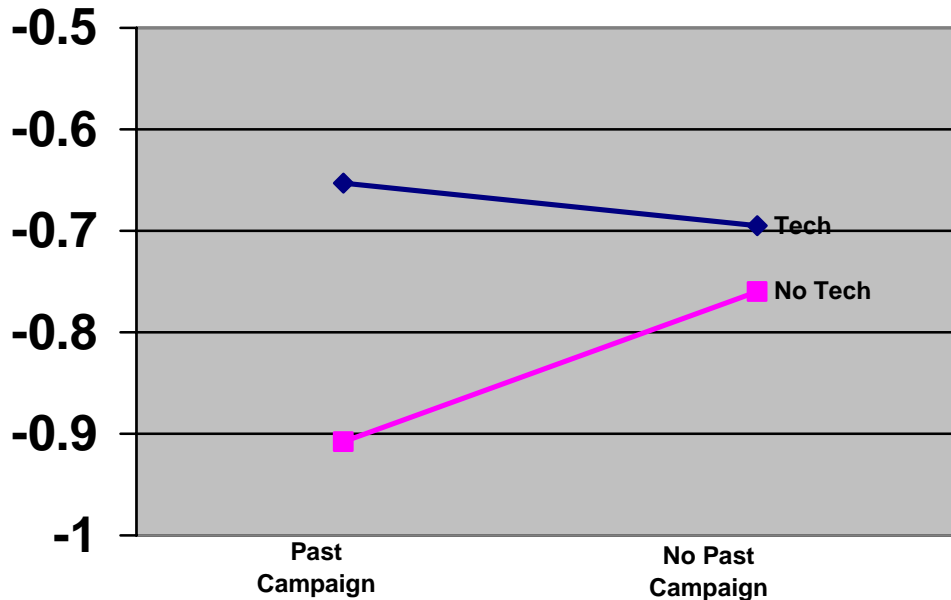
Graph 12.11: The Effect of Past Campaign Information and Divergent Thinking Techniques on Domestic Student's Assessed Creativity



The domestic student pattern of results is similar to that of the creatives, although the effect of the divergent thinking technique was positive toward originality. The campaign/no technique treatment group had the strongest result. The campaign/technique treatment resulted in the lowest score.

12.4.1.4 Interaction Effect of Past Campaign Information and Divergent Thinking Technique on Creativity for Foreign Students

Graph 12.12: The Effect of Past Campaign Information and Divergent Thinking Techniques on Foreign Student's Assessed Creativity



Foreign students were outperformed under all of the different treatment conditions, indicating the complexity of a creative thinking task in a second language. As per the initial results, while the technique decreased their originality score this decrease is outweighed by the techniques positive effect on the appropriateness of their responses as shown in their creativity scores. The campaign information reduced their creativity scores presumably as it also adds in another distant domain that they have weak knowledge of.

12.4.2 Discussion – Interaction Effects of Past Campaign Information and Divergent Thinking Effects for the Different Sample Groups

For account executives the effect is the technique by itself increased originality but decreased appropriateness to a greater effect thereby reducing creativity. The no technique and no campaign information treatment condition lead to highly appropriate ideas that are also reasonably original. Campaign information alone leads to mental set fixation and low creativity. Past campaign information and the technique opens

existing category knowledge and a distant category for both original and appropriate ideas, however these ideas are less creative than the baseline effects.

For creatives the past campaign information did not have the mental set fixation effect it had for the account executives, probably due to their strong knowledge of superior divergent thinking techniques and/or flatter associative hierarchy. Creatives were able to use past campaign as the basis for developing more creative ideas, perhaps to re-focus them on appropriateness factors and potentially also as new points for divergent thinking. For the creatives adding the forced divergent thinking technique reduced their creativity, by reducing both their originality and appropriateness.

Domestic students show the facilitating effect of examples for domain novices as a basis for creative idea generation. Without the past campaign information or the technique their score was relative poor and at a similar level to that with both the campaign information and the technique. Adding a technique without a campaign increased their creativity. So as with the account executives while the technique increased originality scores, its negative impact on appropriateness appears to have been more significant.

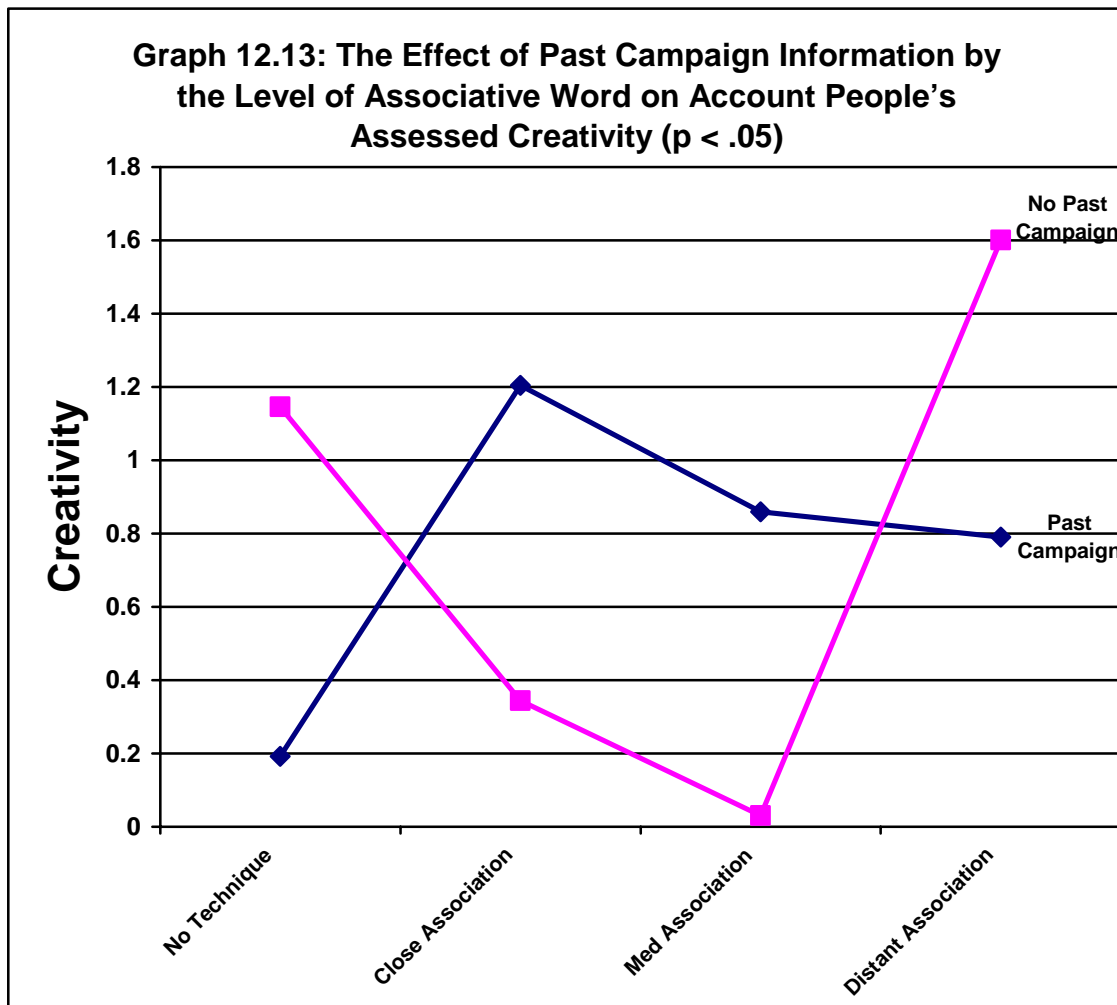
Moreover, the effects of past campaign information had a strong impact on domestic students appropriateness scores even though its effect on originality was insignificant. For the domestic students the fact that the most creative work occurs in the campaign, no technique treatment is interesting. Given the campaign information and the technique the score is at its lowest, remove the technique and it is at its highest. It would appear that the campaign information results in large increases in appropriateness but if combined with a technique the appropriateness of the responses drops dramatically. It may be the task becomes too difficult with both the past campaign information and the technique.

Unlike the account executives for domestic students providing campaign information resulted in informational cues that provided a more creative response than they would have achieved without them. Adding a technique and their primed relatively poor domain knowledge results in connections, with those forced associative words, which are basic in terms of originality and appropriateness due to their low knowledge of the

domain. The baseline result with no campaign information or technique is improved slightly when a technique is added. Their low baseline score means that the cross domain combinations are more original, and probably only slightly less appropriate, due to their poor domain knowledge.

However, all of these effects do not provide a complete picture without also looking at how the level of the associative word influences the creativity of the responses for the different sample groups. This interaction effect of past campaign information by the level of associative word is analyzed next.

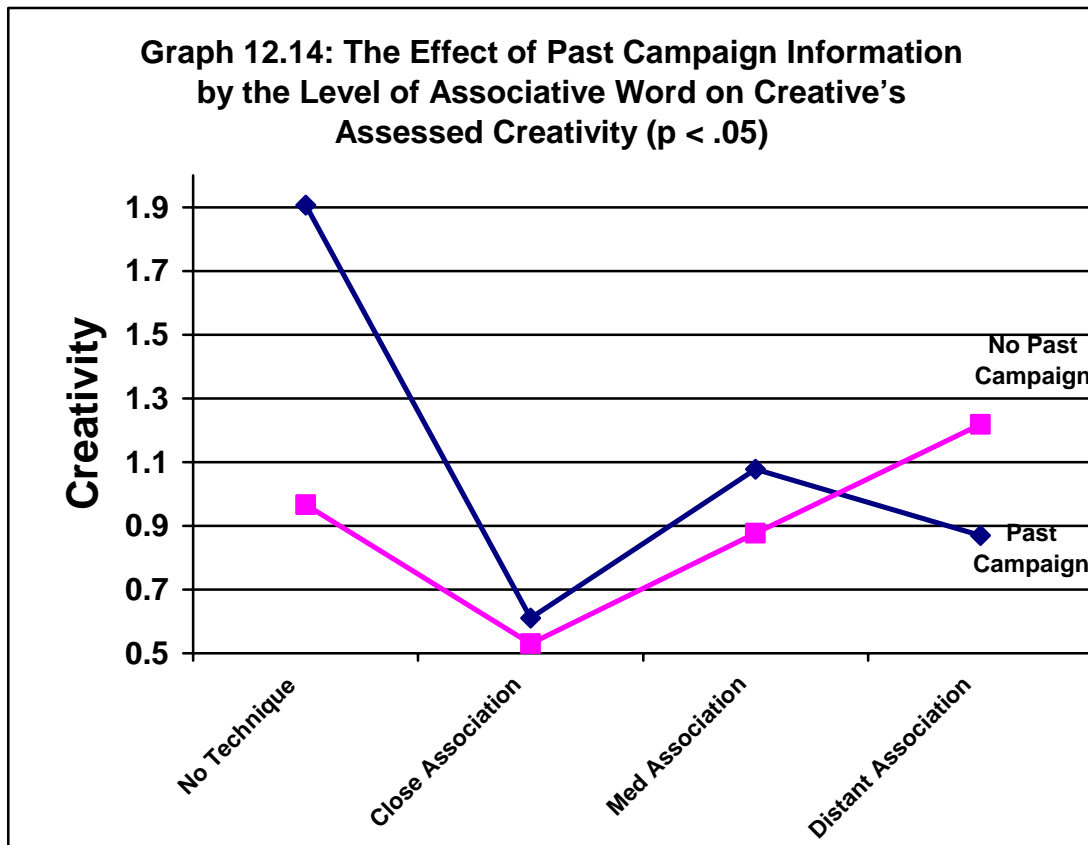
12.5 Interaction Effect of Past Campaign Information by the Level of Associative Word on Account Executives' Creativity



For account executives giving them the campaign information decreased their creativity, as it decreased their appropriateness scores, although providing the

associative words increases their creativity scores. The account executives do better in the no technique/no campaign treatment than they did in any of the campaign information treatments, except for the closely associated word. However, the best work occurs in the no campaign/distant word association condition.

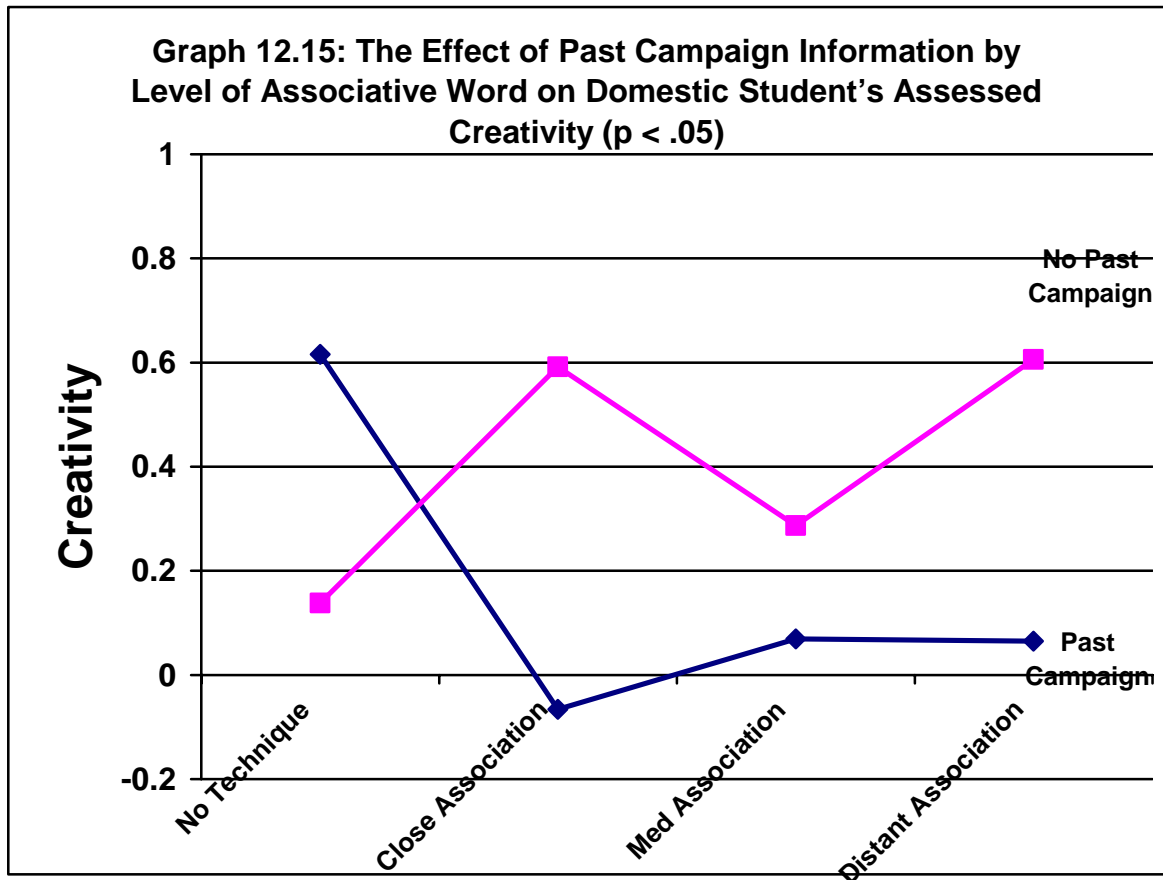
12.5.1 Interaction Effect of Past Campaign Information by the Level of Associative Word on Creatives' Creativity



For creatives, while in the no campaign/associative word treatments their creativity scores increase with increases in the distance of the association, it is not until the associative word is the most distantly associated that their scores outperform the no technique/no campaign treatment group. Additionally, the group that performs the best is in the no technique/campaign treatment.

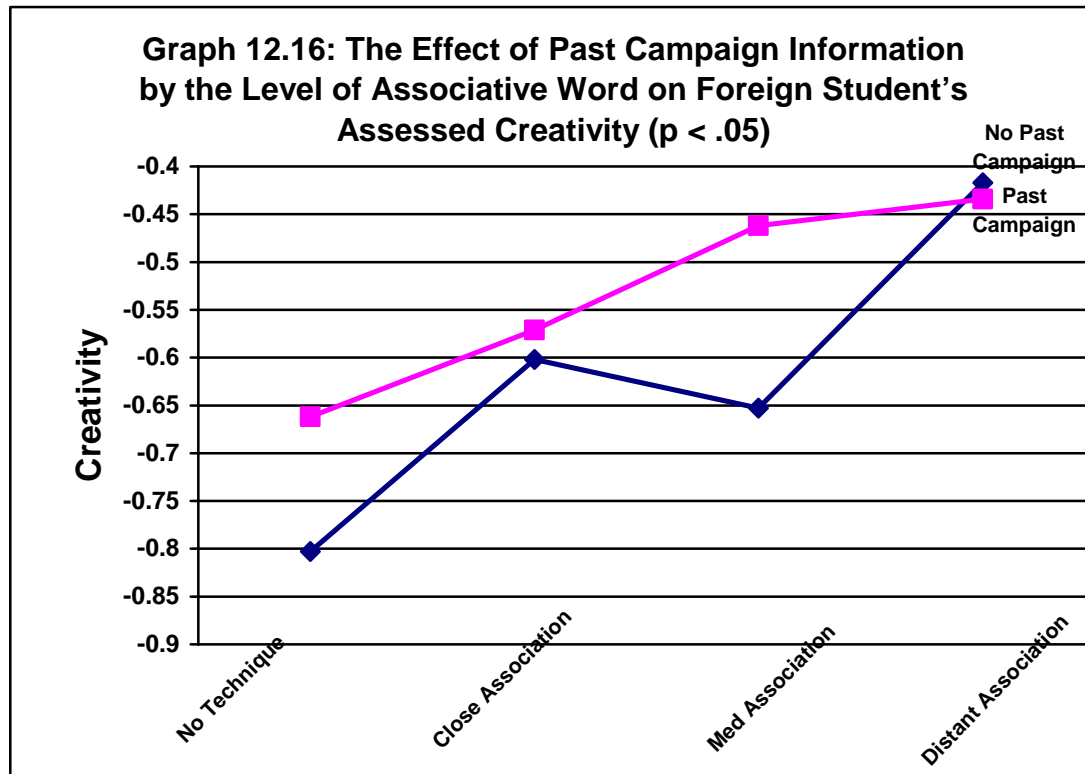
For the no campaign group the most creative work occurred with the distant associative word indicating the technique, if advanced enough, can still have a positive effect for experienced creatives. However, this result is still far less than that of the no technique/campaign group, indicating that informational cues are more important than creative thinking techniques for this group.

12.5.2 Interaction Effect of Past Campaign Information by the Level of Associative Word on Domestic Students' Creativity



The effect for the domestic students is interesting for two reasons. First, their creativity score is at its highest for the campaign/no technique treatment but at a similar level to the distant and close associative word treatments in the no campaign treatments. Campaign information provides facilitating examples that trigger memory categories that would not otherwise have been accessed, but the addition of the divergent thinking techniques adds associative words that the domestic student has difficulty connecting with those triggered memories. Without primed campaign information domestic students were able to cross to distant domains and cue their own knowledge to generate creative solutions.

12.5.3 Interaction Effect of Past Campaign Information by the Level of Associative Word on Foreign Students' Creativity



For the foreign students the no technique conditions scored the worst as the use of the technique generally reduced their originality but increased their appropriateness. However, the more distant associative words showed increases in creativity.

12.5.4 Discussion

For account executives while it appears that the campaign information results in mental set fixation this can be overcome with creative thinking techniques. The more closely associated the word, the more creative the work, indicating that given an activated memory category, more closely associated words are easier to integrate with this campaign information to generate creative responses. They need the divergent thinking technique but not the past campaign information. With no campaign information close and medium associated words may merely act as primes for their extensive domain specific knowledge and lead to mental set fixation. The distant associative word does not do this and with a distant category opened their knowledge of the domain allows them to develop strong original and appropriate connections.

The results for the creatives indicate that it is important to give the creatives facilitating primes, not creative thinking techniques to improve their creativity. It needs to be determined if the results for junior and senior creatives differ, as if this effect is stronger in the more senior creatives, i.e. they improve less with the divergent thinking technique, then it would point to the need to still train junior creatives. This would provide an indication as to whether the creatives' superior performance is an inherent ability or the need to learn the techniques, although it would not be conclusive as it could be argued that more creative individuals are likely to last longer in the industry.

Provide domestic students past campaign information and a technique and they can not make the relevant connections between them. Provide them with past campaign information alone and it works to increase creativity by providing facilitating examples or starting points. Give them no campaign information and no technique and they have no where to start from. Provide them with divergent thinking techniques and this increases either their originality when they have distant words to use in the association process, or appropriateness when they have a closely associated word due to it acting as a facilitating example.

With the campaign information and the associative words they score poorly. The campaign information might have primed category knowledge that they do not have the domain knowledge to be able to relate to the associative words that are provided. Hence while the more distant associative word leads to more original combinations the combinations are not appropriate.

For foreign students their result is unlikely to be due to more distant words resulting in more appropriate responses and therefore the originality must have driven this result. So while overall the technique resulted in less original work than without it, due to very simplistic responses being made in relation to the words provided, the more distant the association of the word the more original the response. People will provide more original responses from their own alternative domain, although those responses may not be judged as appropriate. They jump to the distant category and

make a connection that is original and the most basic simple connection so it will also be judged as relatively appropriate.

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13.0 Final Discussion and Limitations

A number of effects were evident in the results: a negative originality self assessment bias, a negative correlation between the forced associative technique and appropriateness, differing effects for the forced associative technique for experts and novices, mental set fixation among domain experts when given information primes, learning effects, and a variety of interaction effects. These effects and their implications are the focus of this chapter.

13.1 Negative Self Assessment Bias Discussion

There was a negative self assessment bias against originality when the divergent thinking associative technique was used. However, this bias only applied to the technique novices - the account executives and the domestic students. For technique experts, creatives, the simple technique used in the experiment did not improve their originality and creatives were aware of this. For the 2nd language students they thought the technique was making their responses more original when in fact the independent judges viewed their responses as less original; probably due to the simplicity of the domain connections made.

Most people in society would fit the characteristics of the creative thinking technique novices with first language abilities; domestic students or account people, subsequently this negative self assessment originality bias is important. This bias means that ideas developed using associative techniques may be quickly discarded by the idea generator.

To overcome the negative self assessment originality bias respondents need to be made aware of this bias so that they do not discard original ideas. Creative thinking techniques increased originality but ideas were not perceived as original as they were based upon a structured technique. The respondent needs to realize that the aim of the technique is to cross to different domains to gain new insights and therefore they need to be receptive to the ideas that come out. If those ideas are merely rejected offhand the effectiveness of the techniques will be limited.

13.1.1 Appropriateness Problems when using an Associative Technique

In regards to appropriateness, the divergent thinking technique resulted in both the idea generator and the independent judges rating the idea as less appropriate. This result was not unexpected, as in the experiment idea refinement would not have had time to occur. The divergent thinking technique will result in cross memory combinations, and without time to refine those ideas, they will be viewed by both the idea generator and external judges as less appropriate. This is probably because not enough time has been provided for additional connections between the distant domains used in the combination process to be made.

Whether those distant cross domain combinations can be made appropriate, and in what time period, is an area for further analysis. What this results does highlight is that these new, original, cross domain combinations will not initially be viewed as appropriate and without time for idea refinement would be rejected by both the idea generator and others. Moreover, as ideas are evaluated as to their appropriateness based upon the domain specific knowledge of the judge (be it the respondent or another person), a lack of domain knowledge by either the judge or the respondent can result in ideas that may be appropriate being discarded.

13.1.2 Implication One: Designing Associative Creativity Techniques.

First, the idea generator without knowledge of the alternative connection domain will not be in a good position to evaluate a big C idea's appropriateness. Knowledge of the alternative domain is needed otherwise the idea will be rejected. This has important implications for how and when a big C creative breakthrough can occur due to random environmental events. For example, Dr Fleming, the Scottish doctor that discovered penicillin, would not have made the medical breakthrough when his dirty petre dishes grew antibiotic mould, without having identified the moulds connection to the alternative connection domain; medicine. Many cooks and cleaners would have come across similar moulds and effects as Fleming, but they would not have had the alternative domain knowledge to interpret them in relation to the medical domain. Therefore, when designing creative thinking techniques the best effects will involve

associative thinking techniques that allow distant domain connections to alternative domains in which the respondent possesses extensive knowledge.

The effectiveness of the basic technique used in the experiment supports the domain combinations definition and model of creative thinking. The fact that by merely providing three associative words as the basis for creative idea generation without any previous training in this technique resulted in a significant effect on the originality for account executives and domestic students indicates that it is this cross domain associative process that is critical to the idea generation process. However, the poor performance of the foreign students indicates that is not just the moving to a distant domain that is required for originality, there must also be knowledge in that distant domain to which the initial anchor points can be connected. This finding may lead to more effective creative thinking techniques being developed – ones that relate to a person's existing knowledge structures that force an unusual memory category that is also to a domain the respondent knows well.

13.1.3 Implication Two: The Idea Refinement Process – The Importance of Perseverance

Second, the experiment only allowed time for idea generation processes to occur and stronger links between distant idea connections would need development time before those ideas would be perceived as appropriate. Initially cross domain combinations will not be perceived as being highly appropriate by the idea generator as the number of category links between the two domains would be limited. With time a number of links could be made, thereby increasing the perceived appropriateness of the initial idea. For example, the concepts of the moon and tides were not perceived as related by our distant ancestors, but today most people have made links between those concepts.

The fact that the distant associative word that was used in the experiment prompted idea combinations that would be perceived as unconnected, unusual combinations by the respondent, means stronger connections through multiple small c extensions would need to be made by the respondent in order for them to make sense of those ideas. Indeed, many big C ideas may not initially be viewed as big C by the idea

generator but given time those ideas can be developed further, with a number of small c domain links being made that support and refine the initial cross domain combination. However, if using an associative technique leads respondents to more quickly reject those ideas then this refinement process may never take place. Additionally, most people probably quickly give up on new bizarre ideas given the high cost of making the extensive memory links required, especially if there are few immediate rewards.

Hence, for big C ideas to come to light, perseverance may well be more important than insight. How and what influences the propensity for a person to further develop an original, but initially inappropriate idea, was not analyzed in the experiment, although as mentioned above, knowledge of the alternative combination domain might be a key factor. This knowledge of the alternative domain may allow for a number of small c connections to be made by the idea generator at low cognitive cost – the process of insight described by Schilling (2005).

The experiment in this thesis only focused on idea generation processes. Essentially what needs to be determined is to what extent cross domain combinations are rejected out of hand and what influences that decision? It is anticipated that unless the idea generator has knowledge of the combination domain that was used for the new idea, that idea would be viewed as inappropriate and rejected. This is reflected in one of the qualitative responses in appendix 1. A creative team who stated that they need to present all their creative ideas to the creative director even if they themselves did not like the idea, as the creative director often took a different view of what was a good or bad idea. The creative director plays the role of the domain expert identifying appropriate ideas through their extensive client based knowledge and experience.

13.1.4 Summary

So in summary, divergent associative techniques will result in more original responses for people who are not technique experts, however they must be made aware of the negative response bias so as to avoid discarding those ideas offhand. Additionally, a person with high domain specific knowledge is in the best position to firstly identify the potential appropriateness of a new idea, and secondly to make further refinements

to that new idea in order to increase its appropriateness. However, this domain experience also must be tempered by the finding, to be discussed later in this chapter, that domain expertise leads to mental set fixation without the use, and/or internal knowledge of associative strategies or techniques.

13.2 Differing Effects for the Forced Associative Techniques: The Moderating Effect of Domain Specific Knowledge

The fact that the technique had differing effects on each of the sample groups illustrates the importance of existing domain knowledge as a moderating influence on creativity. Account people, who are the domain experts, benefited a great deal in terms of originality from the technique, and while the technique did reduce their appropriateness, their creativity score was higher with the technique than without it indicating a relatively small negative appropriateness effect. In contrast, the results for the domestic students, who are not domain experts, showed a negative effect of the technique on appropriateness, which outweighed the positive effect on originality. Subsequently, the domestic students creativity scores were lower with the technique.

These findings support the contention that domain specific knowledge is needed once a cross domain category connection is made in order to find an appropriate combination. The account executives had this knowledge and hence their results with the technique were more appropriate than for the domestic student; who did not possess this knowledge. Both the domestic students and account executives were able to cross over to more distant domains and make connections but the domestic students lack of knowledge of what makes an appropriate advertising idea meant that their choice of combinations was less appropriate than that of the account executives.

13.2.1 Implication

So when forced to use a distant domain in the combination process, domain specific knowledge assisted the idea generator. Hence the expert is in a better position to take advantage of random environmental based combinations or make use of forced

divergence associative techniques. Subsequently, domain specific knowledge in itself does not limit creativity as long as associative techniques are used.

13.2.2 The Influence of Domain Specific Knowledge on Creativity: Novices versus Experts

The initial assumption prior to the qualitative research was that domain novices would have an advantage over domain experts, as they would be unhindered by mental set fixation effects i.e. the limited anchor point of the initial domain. Additionally, the novice, unlike the experts, would not be able to provide satisficing, within domain responses that are unoriginal. This assumption was based upon the premise that the novice must open up alternative domains to find a solution and while few of the responses would be ideas that were new at a societal level, some of their ideas would be. However, the experimental results emphasize the need for the idea generator to possess extensive alternative domain knowledge and a base level of the anchor domain knowledge in order to use as a basis for making cross domain connections. This requirement is seen more clearly in the data showing the effect of the different levels of association words on the creativity measures.

13.3 Effect of Associative Word Level on the Different Sample Groups

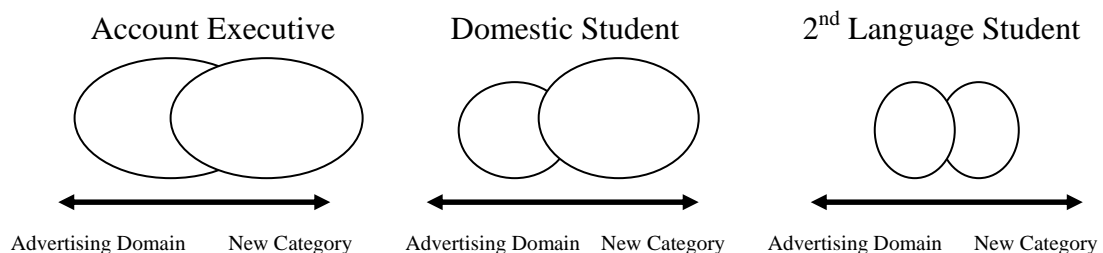
Account executives performed best with the most distantly association word, even better than the creatives with the same word. For foreign students while the technique allowed them to cross to unusual domains, a lack of knowledge of that distant domain limited their ability to develop those ideas further. For domestic students their performance levelled off after the moderately associated word, with no difference in creativity for the scores for moderately and distantly associated words.

The strong performance of the account personnel with the distantly association word illustrates how their knowledge of the advertising domain allowed them to develop solutions that were independently assessed as original, not merely bizarre. For second language students these extensive knowledge categories did not exist and hence while

the associative technique took them to more distant domains they were not able to make anything but what was viewed by first language judges as basic connections, while for domestic students their limited domain knowledge limited their potential creativity. An alternative hypothesis is that foreign language students emphasize appropriateness rather than originality due to their more structured education systems, however this hypothesis is not supported due to their poor appropriateness scores irrespective of whether they have the past campaign information or not.

For the domestic students these results indicate that the levelling off effect that occurred might not be due to skills with the technique, but more due to knowledge of the initial domain. Without extensive category knowledge of the initial advertising domain the respondent is unable to find a relevant link between the divergent domain provided, and the initial domain, advertising. So for account executives their extensive knowledge of the advertising domain meant that when given a forced divergent associative word they had a large pool of advertising knowledge to which to find a relevant connection. This was less so for the domestic students and even less so again for the second language students. It must be noted that while the connections that were made by the domestic and second language students groups were less creative at a societal level they were probably highly creative at an individual level.

Creatives developed better ideas without the technique and without the technique their performance was much higher than any other scores. Add this information to the fact that while the scores of foreign students improved with the more distantly associative words it still did not reach their non technique level and it all indicates the importance of not only creative thinking techniques but also knowledge of alternative domain information in order to make those distant connections. It would appear that a person needs category information stores in the distant domain in order to make relevant new connections.



13.3.1 Technique Limits

The originality potential was influenced by the divergent thinking technique with apparent limits to the originality of responses when associative words were similar to the product category; the close associative words. So while respondents need to learn the ability to apply creative thinking techniques when distant domain combinations are required, simple associative techniques will not assist people who already possess knowledge that would take them beyond those close domains. This is because the simple associative techniques in fact limit a technique expert's originality through providing associative cues that act as limiting combination points, or using the terminology of Wiley (1998), 'mental set' fixation. By providing domain experts with closely associated words this merely resulted in responses that were similar domain connections and hence not as original as what they could have achieved without them.

These results support the contention that creative thinking techniques can increase originality by forcing respondents to open distant domains for use in the idea generation combination process, as long as their knowledge of both the initial and distant domains is substantial enough for them to find relevant ideas for combination. This is reflected in the finding that the more distant the associative word the more original the response for the domestic students and account people, however, for the domestic student it levelled off at a level only about half that of the level achieved by account executives who had the most distantly associated word. So account executives were able to make better use of the distantly associated words due to their superior knowledge of the initial domain; advertising. Moreover, this distantly associated level was at a similar level as that achieved by creatives with the same associative word.

So for people with knowledge of the domain this broader base of knowledge not only increased their ability to determine the appropriateness of the response it provides a wider range of connection points to make highly divergent connections to. Therefore, mental set fixation can be overcome through the use of associative techniques and the domain expert is in the best position to take advantage of those distant cross domain ideas. Hence associative techniques must be designed based upon the domain specific knowledge of the participant. If the associative technique uses cues that are too simple

for the respondent as they are a domain expert then this will limit creativity by working as primes that ensure mental set fixation. If the associative cues are too complex then the respondent who is the novice in the initial domain will have difficulty finding a connecting point between the two domains.

13.3.2 Hierarchy of Effects

Given the domain connections model of creative thinking, knowledge and experience in cognitive strategies that combine distant domains is critical to creative thinking. The advertising creative's job means they are constantly looking for, practising, and applying cognitive processes that encourage their ability to see combinations between ideas from distant domains. Other groups, and in particular account executives who are focused on appropriateness factors and meeting certain universal client criteria, would be likely to focus on cognitive strategies that look for connections between ideas within the same domain rather than connections across domains. While the experiment identified this difference by looking at how each of the samples perceived the association between the three words used in the divergent thinking treatments, it was not able to identify whether those differences were due to inherent differences or a result of learning.

Subsequently, as per the remote associative hierarchy theory of Mednick (1962), the results indicate that creatives have a flatter word associative hierarchy, while account executives have the steepest associative hierarchy. However, as can be seen in chapter 12, graph 12.8, with the use of divergent thinking techniques account executives were able to generate more original responses than domestic students, who have a flatter associative hierarchy. This result for the account executives shows that creative thinking techniques appear to replicate the hierarchical ability, and with more complex techniques than those used in this experiment the techniques may lead to yet more original responses. This indicates that it is not merely inherent abilities that are critical to creative thinking but also creative thinking techniques, although the relative importance of each is yet to be determined. The flatter associative hierarchy effect shown for the creatives may be a result of learning and experience in divergent thinking techniques rather than any inherent ability. Further research and analysis of the data is needed.

13.4 Effects of Past Campaign Information

The impact of the past campaign information supports the anchor points or mental set fixation theory of the creative combination process. For the group with strong domain knowledge, the account people, the provision of past information reduced their originality and also, given the inappropriate nature of the past campaign information, the appropriateness of their responses. For domestic students, who are domain novices, the use of that information worked as a facilitating example increasing the appropriateness of their response by providing them with more appropriate domain information than what they would have achieved without it. However, past campaign information had a slight negative effect on the originality of their responses.

For creatives the past campaign information increased their appropriateness and also had a large positive effect on their creativity score, indicating that it also helped their originality. While their advertising appropriateness criteria knowledge is lower than that of the account people, the creatives ability to make relevant connections between distant domain information through knowledge of creative thinking techniques and/or a flatter associative hierarchy means that the past campaign information worked as a facilitating example.

This research helps to provide some understanding in relation to the question of the past researchers, Marsh, Landau and Hicks (1996), who state that with examples there is a fine line between those examples working as facilitating effects, or alternatively acting to constrain creative thought due to mental set fixation. This fine line between examples acting as facilitators or constraints depends on the domain knowledge of the respondent and/or their knowledge of creative thinking techniques. In novices primes result in facilitating effects as long as those novices are not completely ignorant of the domain that is primed. For domain experts primes result in mental set fixation, unless they have knowledge of creative thinking techniques and/or flatter associative hierarchies. This finding is inline with the U shaped model of knowledge effects on creativity (Simonton, 1984; Weisberg 1999).

The critical contention of this thesis is therefore that people will become fixated and reliant on domain specific knowledge which will result in lower levels of originality unless they have the ability (inherent), or have learnt how to use cognitive processes, that allow forced divergence or cross memory thinking to occur. In other words anchor points and domain specific knowledge will result in functional fixedness unless people have knowledge and ability to apply cognitive processes that allow cross domain combinations to occur. Additionally, if people are constrained by situations that force them to use particular knowledge in making a response (the forced divergence treatments), this will limit creativity unless those forced associations are new to the respondent.

13.5 Learning Effects

The experimental results show that it is not difficult to apply simple associative word techniques in creativity tasks, but that respondents will benefit from learning the technique when the technique is more difficult. Using distant word associations as part of the associative technique prior to learning the technique resulted in poor originality scores as the task was too complex. When those distant associative words were used after some learning had a chance to occur they greatly enhanced originality. This result illustrates the fact that it is not just the provision of distant combination points that is critical to originality, but more importantly technique experience that results in the knowledge of cognitive strategies to make cross domain links.

Learning to use more complex associative techniques took longer than more basic techniques. Additionally, the basic associative terms used appears to have a limit in regards to the level of creativity that can be achieved. Closely associated word techniques will assist technique novices, but once a person becomes familiar with associative techniques and the related cognitive processing strategy style, more complex techniques will be required. Further research is needed to see if yet more remote associative techniques will result in even more originality ideas being produced by both the domain and technique experts; the account executives and the creatives.

13.5.1 Implications

These results support the contention that it is knowledge and experience in associative techniques, or cognitive strategies, which is important when generating original ideas. Once a person learns to apply a cross domain combination strategy they are able to make distant domain connections as long as they have some knowledge of the combination domain primed by the associative technique.

This is important as creative breakthroughs have been connected to random events (Schilling, 2005; Simonton, 2003). These random events provide the connection point for cross domain combinations to be made i.e. antibiotic mould + medicine = big C breakthrough. The increased ability of some people to make these distant associative connections has in the past been attributable to inherent abilities (i.e. remote associative abilities, Mednick, 1962), but it may be a cognitive ability that can be enhanced through learning associative techniques that replicate cognitive thinking processing strategies combined with knowledge of the alternative domain..

Given that knowledge and familiarity with cognitive strategies that enable a person to make connections between different domains is a learnt skill, then we can prepare people to be more creative by teaching them the benefit of associative techniques and cross domain thinking. If this is the case, while we can not ensure creativity, we can greatly increase the chances that a person is equipped to make those connections, if the random events/information does come along, by developing this knowledge in associative techniques.

13.6 Interaction Effect – Past Campaign Information and Divergent Thinking Techniques

For account executives, who possess strong domain specific knowledge, primes without techniques lead to very low levels of creativity due to mental set fixation. This fixation was overcome with divergent thinking techniques. Without primes these domain experts performed strongly without any divergent thinking techniques but the best overall performance occurred with the most distantly associated word. So account executives were able to develop more creative responses with more distantly

associated word techniques. It would be interesting to see if still more distantly associated words lead to still more creative scores for this group.

Overall therefore account people's knowledge of the domain is a double edged sword, it leads to mental set fixation when primed, and knowledge of creative thinking techniques can overcome this fixation to some extent. However, if their domain knowledge is not primed and more complex divergent thinking techniques are provided they can move to distant domains and then use their domain specific knowledge to make relevant connections.

In relation to the domain combination model of creative thinking, the domain expert given primes will open up an initial category that is less appropriate than they would without that prime. With techniques they can make use the distant word to make connections, however the best effect is to not limit their anchor points and provide distant associative techniques. This allows them to go to distant connection points and once there their strong domain knowledge allows them to make a relevant connection without being mentally boxed in due to mental set fixation brought about by the past campaign information.

It must be noted that these distant category connections made through using an associative technique resulted in more creative solutions than achieved through the baseline no campaign/no technique scores, but only when using the distantly associated word. Presumably the account executives strong creativity scores when provided with the distant associative word was also averaged by the fact that there was a need to learn the associative technique i.e. some respondents had the distant associative word provided to them in orders one or two and therefore did not have the benefit of learning the associative technique. Subsequently it would be expected that with experience with the technique the scores for the treatment condition with the distantly associated word would be improved further. So for the account executives the divergent thinking techniques replicate the abilities of the creatives in that they made them mover to distant domains to find more original combination points.

For the domestic students, as the technique and domain novices, while either providing them with past campaign information primes (facilitating examples) or

providing them with associative techniques assisted their creativity, adding in both campaign information and techniques made the process too difficult. Additionally, their lack of domain and technique knowledge limited their ability to produce highly creative work.

For creatives they outperformed all others without the associative technique. Their existing knowledge and expertise in associative techniques meant the associative words used in the experiment limited their creativity. The past campaign information however assisted them to develop more creative work.

For the creatives and domestic students past campaign information had a strong effect as a facilitating example. However, for domestic students the facilitating effect of the past campaign information only took them up to a level that was still below the baseline no technique/no past campaign information scores of the creatives, and only slightly higher than the baseline score for the account people. For creatives the score with the past campaign information was three times this level. This indicates that while the example of the past campaign information increased the scores of the novice domestic students, by providing them with better domain category information than what they would achieve through their own limited domain and technique knowledge, creatives on the other hand can use their knowledge of creative thinking techniques and/or flatter associative hierarchies to go far beyond this level.

Moreover, what drove this strong effect on the domestic students creativity was the past campaign information's strong impact on appropriateness scores, as the effect on originality was insignificant. For the domestic students the fact that the most creative work occurs in the campaign, no technique treatment is noteworthy. Provide domestic students with the campaign information and the technique and their scores were at their lowest, remove the technique and their scores were at their highest.

So the campaign information resulted in large increases in appropriateness for the domestic students, but if combined with a technique the appropriateness of the responses drops dramatically. From the combinations model perspective this is explained by the fact that the past campaign information provided examples which worked as facilitating examples for the students, and subsequently more appropriate

responses. However, adding the need to then connect their limited facilitated example based advertising domain knowledge with ideas generated from what were either close, moderately or distantly words in relation to the product category, and they did not possess the domain knowledge to do this. The task becomes too difficult given their limited domain knowledge when both the past campaign information and the technique are provided.

So for the domestic students the facilitating examples of the past campaign information opened relatively undeveloped memory categories however, further adding new categories, that their limited knowledge means they have difficulty relating to, through the provision of forced divergent associative words, and the responses will be poor connections and uncreative ideas. Their lack of knowledge of the domain opened due to the facilitating examples means having to connect those ideas with the forced divergence words results in poorer responses than if they were free to come up with their own responses.

Finally it is interesting to note the differing effect that occurs when providing both campaign information and the associative technique. For the domain experts, the past campaign information lead to mental set fixation that was overcome by providing associative techniques. By providing these domain experts with a distant word after priming their domain specific knowledge it reduces their ability to make relevant distant domain connections. However, for domestic students and creatives by providing associative words techniques after also providing facilitary primes this led to mental set fixation.

So priming experts will lead to mental set fixation that can be overcome to some extent with associative techniques. However, the experts would do better with distant associative techniques and without the primes. Priming domain and technique novices will lead to higher levels of creativity that is then reduced if associative techniques are also added. Finally, priming people with a reasonable understanding of the domain who are technique experts will lead to high levels of creativity that is then reduced if associative techniques are provided that are inferior to their own internal techniques. In summary there is no one size fits all for the use of creative thinking techniques, and they must be developed based upon the respondents domain and technique

expertise.

13.7 Limitations Section: Unexplained Variance

The regression equations for the three measures still show a significant amount of unexplained variance. This can be attributed to the complexity of the research design. The opportunity to undertake experimental research at leading advertising agencies is a rare one and hence a large number of effects were manipulated. While important main effects have been identified further experiments are now needed to replicate individual treatment conditions and provide additional statistical support for the findings.

13.7.1 The Influence of Inherent Versus Learnt Associative Abilities

What is unclear from the results is the influence of inherent versus learnt associative skills. The creatives outperformed the other groups when they were not forced to use a creative thinking technique. While the qualitative research indicated that they have knowledge of creative thinking techniques which are undoubtedly superior to the basic associative technique used in the experiment, the results also indicated that creatives have a flatter associative hierarchy in relation to their perceived association of words. Additionally without the campaign information creatives' best results were with the distant associative word indicating the effectiveness of more advanced techniques. From this experiment it is not clear therefore how much, if any, of the superior performance of the creatives is due to inherent associative abilities based upon how their brains are wired and how much is due to their knowledge and expertise in associative techniques.

13.7.2 Other Factors

This thesis leaves many questions unanswered. Many aspects of the thesis were not touched upon through either the qualitative research or the experiment. While a four

stage of model of creative thinking was proposed and given literature support, only one part of that model was tested through primary research methods. Even with this research it is acknowledged that a range of factors may influence the creative thinking process.

It is acknowledge that many aspects such as time, instructions and experimental conditions can affect results of creativity tests (Harrington 1975). The results of this experiment only looked at two factors information primes, and the influence of forced divergent techniques. It also only tested part of the creative thinking process, idea generation. Further research is therefore needed to look at the influence of time, individual motivation, and the many other influencing factors on the various stages of the creative thinking process.

Finally, while only one small part of this thesis' theoretical proposals has been rigorously tested the results are clear and methodologically sound. What this thesis has clearly shown is the importance of understanding the complexities of the creative thinking process in order for it to be improved. It is crucial that we continue to research and develop our understanding of this process if we want to encourage and nurture creativity through our educational systems. It is clear from this thesis that while we can improve individual creative abilities the creative mind is the prepared mind, and knowledge of a wide range of domains rather than a narrow specialist focus will allow us to make the significant breakthroughs that the world of today and tomorrow so desperately needs. For education to result in the creative individuals our companies and societies are asking for, our educational systems must encourage broad bases of knowledge not narrow focused expertise.

Appendix 1: Depth Interview Responses

Q. When working with someone else do you normally develop creative ideas individually and then discuss them with your partner or develop those ideas with the partner from the outset?

They work as a team, work ideas off each other. They sit down and write ideas as they go. As soon as they get the brief they are already thinking of ideas, then they will talk about ideas and feed off each other. One of the good things about working as a team is they can help each other evaluate ideas as well as providing each other with new angles. They might have an idea, which one or the other person initially does not think much of and would discard, but the other person hears it and develops it based upon a new angle. It works well as a two person team, but not any more than two. A third person might be more concerned about ensuring the group accepts their individual ideas, social aspects – two versus one.

Another advantage of a team is it is easy to get over rejection of an idea. It is not then a matter of constantly saying what I did wrong.

This is a very interesting and new area. Advertising creative's have a job that is highly stressful and contains very high levels of idea rejection. Handling that rejection is probably a major issue for creatives, and is made more difficult in that the generating of creative ideas is highly cognitively taxing and those ideas are attributed directly to a person or team and not external sources. At the same time the client may have very different views as to what constitutes a good ad for their brand and subsequently a large number of ideas will be rejected. Working as a team would lower the burden of negative self-analysis while ensuring a high degree of satisfaction and ownership of ideas that are successful. It also relates well to the fact that it is often only very senior creatives that work individually as they have achieved a level of understanding and acceptance of both their own abilities and the assessment problems inherent in the industry process.

Q. When working with someone else do you normally develop creative ideas individually and then discuss them with your partner or develop those ideas with the partner from the outset?

Initially they generate their own ideas and write them down, and then they discuss those ideas with their team member.

Q. When working with someone else do you normally develop creative ideas individually and ...

They tend to work initially as individuals. Once they have the brief they develop their ideas individually and then use each other as sounding boards once they have ideas to assess the quality of those ideas rather than as a basis for initial idea generation.

Relative to other teams, a quiet team.

Q. When working with someone else do you normally develop creative ideas individually and ...

They get the idea and write down their own ideas based upon the Unique Selling Proposition (USP), then discuss those ideas and if one or other of them sees a good idea they will take it and develop it further.

Q. When working with someone else do you normally develop creative ideas individually and then discuss them with your partner or develop those ideas with the partner from the outset?

It depends – usually they get the brief and try to work out the one thing together, then they sit down and develop ideas individually before they discuss those ideas together.

Q. Is creativity inherent?

While everyone has the ability to be creative, the difference between a good creative and a great creative is the inherent ability.

Q. Is creativity inherent?

Everyone (with a brain) has the ability to be creative and everyone is equally creative, just a person may be more creative in one area/field of work, and someone else in another. It is now the brain works in an area.

Q. Does your best work get to the market?

No, they are put in the bottom draw – and may be reused on later projects.

Q. Does your best work get to the market?

Some of them, yes. But ads must focus on the one idea. People can only take in so much information.

Interesting the only creative I have interviewed who said that yes some of his best work made it to the market. This may be a reflection of the strong awareness of what makes a 'good' ad in the eyes of the client and a focus on creating the good ad. The focus on the one central idea combined with a customer based idea development techniques may mean that he is able to generate ideas that he knows are good, not through their level of extraordinary originality, but through a successful combination of an effective level of originality to grab attention combined with a very good fit with customer requirements.

Q. Do you think your best work makes it out there?

The best work does not make it out there you – you still have to be able to sell things. This agency is not a sweat shop. He has worked in sweat shop agencies, they are a dynamic environment with lots of ideas buzzing around which is good but a pressure environment.

There is creativity in the industry. Just look at the award winning ads, however these are not a good reflection of what works – for the client.

The industry is not about creativity it is more about selling – to the client. There is still potential for creativity but within certain dimensions, the box, the parameters of the industry/advertising.

One lesson to apply, not just to advertising but to life is that you need to treat everyone as a client, know what their angle is, what they want.

Q. Does your best work get to the market?

No, there are a number of ideas sitting in the bottom draw waiting to be used.

Q. Does your best work get to the market?

Some of it yes.

Q. Does your best work get to the market?

Sometimes, not often.

Q. Does your best work get to the market?

No, a lot of their ideas are watered down. The idea may be watered down to such an extent that she does not want to acknowledge it anymore. "Is that your ad?" "No"

Q. How do they handle rejection of creative ideas?

It is a roller coaster – you can have a good idea accepted and be on a real high one moment and the same day a great idea is rejected and you are on a real low. They can handle the rejection as they know they have had so many good ideas already it is not them. It is others rejecting good ideas.

Q. How do they handle rejection of creative ideas?

You fume, you do not like it. You are suppose to get over it and move onto the next thing but if it was a great idea, and a number of rejections have occurred recently, it is not easy to do.

Q. How do they handle rejection of creative ideas?

Not easy – having two people helps as you half the credit but can also give them half the blame. The creative director does not give a lot of encouragement.

Senior creatives work alone because they know what is a good idea, they can focus on it and do not have to listen to others.

Q. Why is the industry so young?

There can only be so many senior people in an agency. There is also a high level of burnout. There is a long waiting list of people trying to get their job and therefore a good agency can get new people in and work them hard. The industry is also constantly changing. Client likes to see young faces.

Q. Why is the advertising industry so young?

It was not as young in the past. Fresh faces, fresh ideas maybe. Sure it maybe some ideas do not make it out there but you have to enjoy your job. If he did not he would just leave. If you needed to get your creative buzz elsewhere then you might as well just leave. It is a stressful job, there is pressure all the time.

Q. It is a high stress industry you have the extremes of highs and lows. Some days are great, other days you want to quit. Once a month they may feel liking giving it all up and doing a lower stress job, but this passes. Good potential for high income earning (four years of hard work and you can earn what a doctor earns). The people they looked up to in the field are all gone however – retired to other occupations or businesses. Used to be able to earn better money in the industry, seems to be a bit tight at the moment in NZ industry.

Q. Why is the industry so young?

Not so much so in this agency. Maybe young people are better able to come up with new ideas for new products to target the younger market, but older people can do this also. In the UK they have cool-finders, people who go out looking for ideas that are cool to sell to young people. The youth market is a lucrative market. However the cool-finders have not been all that successful as the youth market is very fickle, they change their behaviour all the time and the cool-finders have often not been able to find the right ideas.

Q. Why is the industry so young?

It is a stressful job. Senior creatives can earn good money and probably go and open a nightclub or something – something where someone else is not telling them whether their idea is any good or not. It is still a great job, sitting and thinking all day.

Q. Do you have any advice for new creatives entering the industry?

Get a book and look at a person's ideas and copy the techniques and they will become your own. Come in before everyone else and work after everyone else has gone. Get a mentor. Be passionate. The people who are not passionate do not make it.

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.

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

He has a young child – he got some information from the school talking about how to not evaluate a child's art. That they will have a different way of looking at things, that art is important to them and that they may be looking at things entirely differently from you. What is important is the journey, the doing of the art itself, not so much the output.

This is true but problematic – as creative must start with appropriateness if we do something the first time it will be very original as we do not know what is wrong or right, however in subsequent times of generating ideas we may apply appropriateness criteria that we learnt from the first time – thus setting our memory categories that we open and hence limiting our creativity the next time. We can overcome this with creative thinking techniques.

Q. Do you have any advice for new creatives entering the industry?

Get into the environment. You learn a large amount in the first few months. Colour is very important it represents things to people, that and music, which has an emotional component and is therefore important.

Speak to creatives – not anything formal, but discuss with them what they are working on. He has chatted with Pete, as Pete must have been stuck for ideas thousands of times.

Agreed that one of the things you learn through experience is what ideas will and will not be accepted.

Q. Do you have any suggestions for people entering the industry?

Advice to new creatives – have to love what you are doing as the rewards are not great, especially at the start.

One thing they had learnt – experience – was which ideas to go ahead with. Example idea 1,2 and 3 can go straight to ideas 3

Q. Do you have any suggestions for people entering the industry?

Have to be willing to accept rejection. Need to work in an agency but it must be the right agency – influence and emphasis on allowing good creative ideas to get through.

Q. Do you have any suggestions for people entering the industry?

It may well be in the advertising industry that the big hurdle for new creatives to overcome is the ability to sell their ideas. They seem to be searching for structure and a basis for determining what is a good idea and what is not. For many therefore this can lead to a lack of the development of their own creative ideas (cross memory category links) and repetition of existing ideas. They therefore come across as not creative. However their problem is that they may do the opposite and develop very novel ideas but they do not have the experience of the creatives who have been in the industry for a while and therefore do not know how to make the idea into something that the client will accept. At the same time the problem for more experienced creatives is that they must ensure they do not become too focused on client requirements and learning techniques and concept developments that they know have worked in the past and will probably be accepted by the client otherwise they will become stale and provide appropriate ideas that lack the originality. A comment was that the industry requires a lot of new ideas and they must be careful not to become dependent upon what they have done in the past or they will become stale. Some people are more able to think laterally than others. He did not do so strongly in a structured educational system but his brother did. Everyone has their own areas of strength.

Q. Do you have any advice for new creatives entering the industry?

Be humble, sometimes the new creative is too cocky, they may not have that many great ideas or even if they do and they are good, they still have to remember that they must work with people in the agency/industry. Do original work, there is a lot of stuff out there currently that is not original, it is just a rehash of old ideas with slight changes in execution.

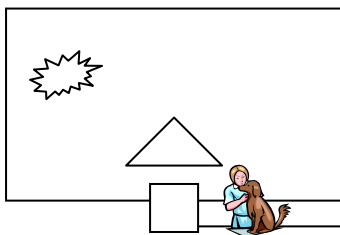
Q. Do you have any advice for new creatives entering the industry?

You must be enthusiastic and enjoy your work as it does not pay well.

Use the senior creatives. There are a lot of great helpful people here (in DDB) that do not mind helping. Many of the new young creatives protect their ideas when they come in as if someone wants to steal them, but they should discuss ideas and ask the senior people. The creative director is helpful but does not have the time to mother the new creatives. The senior creatives know which ideas are the good ideas, whereas as she is still relatively new she still does not have a strong opinion on a lot of creative ideas. She will have plenty of ideas but does not have the same skill in determining which are the best ones that will make it. Her and her team partner will develop fifty ideas on each concept and the creative director might look at one hundred of their ideas and choose just one (if they are lucky) that goes through to the client, and the client may still not accept that idea.

Q. In general what do you think of the creative brief?

Usually it is not a great (well written) document. They condense it down to the key word/concept/the unique selling proposition. Usually the suit does not think like a creative.



Example of the problems that can occur when people do not understand the creative process: Demonstration of where they end up as a creative team when dealing with the client (*could be an analogy for research as well*). From the initial picture of a house (selling roofing material), someone says it should be about family as you are roofing your house to protect your family so they add people. Then someone else says you need a pet for today's family – add a cat. Another person says they do not like cats - add a dog as well. Dogs must be fenced ...etc. Eventually the question is asked – what is the ad for and no one is sure anymore.

One of the common issues that is highlighted with this example is that the client often wants to put far more material in an advertisement than will be taken in by consumers. The client seems to either not know, or forget, that the advertising medium

as well as the level of the attention of the audience, mean that only limited stimuli will be comprehended by the audience. When they see the ad they are essentially seeing an ad in an artificial setting, paying too much attention to it, and have a predisposition bias toward the ad stimuli as they have extensive knowledge of the product category/brand/message etc meaning that they are able to process the ad information using much less cognitive capacity than a target consumer.

The least creative work is often done for the big client who knows what they want and pays you to do what they want. The most creative work is for the small client who does not have the money and is therefore happy with whatever you give them. This allows for creative freedom. Example kiwi? girl – small client came to them with \$5000 and asked them to do something. They did something quite controversial and it had big results. Something controversial will get people talking.

Q. How could the creative brief be better used?

It would be useful to know the client better. Some clients you can discuss the idea with them, get them to see your point of view.

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.

The creative director has to see many different campaigns going on at the same time – a difficult job that deserves respect.

Q. In general what do you think of the creative brief?

Depends upon the person writing it. Sometimes it is good, sometimes not so good. Example Watties wanting to sell cat food, the Suit says they want to double their sales in a competitive marketing 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 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.

Q. How could the brief be improved, would more consumer research help?

Sometimes the target market information is correct which helps. The suit needs to better understand the creative process. The suit and the client often want too much

information in the ad and need to get it down to the one key unique selling advantage. The tone is also useful – the tone being the client type, what will they accept – conservative vs. willing to try something new.

Q. Do you have any thoughts on how the creative brief could be improved?

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.

Q. Would consumer research information improve the brief?

Sometimes if they have some insight there it can help – had a tonker toy insight they used as the basis for an ad – father's wanted their sons to play with something tough not like dolls, that insight was useful.

Q. Would it be useful to be closer to the client?

Yes it would. *Company X* is a client she does know, as they are there everyday having meetings, and she can see why they work the way they do. They have a very hierarchical structure and the lower downs are second guessing what the person above wants, not wanting to take risks.

For the client and the suit it is different than for the creative, for them it is just a job and they want to stay there, for the creative it is more than just a job.

She hates it when a suit second guesses what the client is going to say and says 'I know the brand logo is too small we can do something about that' – when the client would probably not even have thought of it.

Q. What motivates you most about your job?

They have creative outlets outside the agency – music and fashion.

It is a great job. If they had been told as a kid that they could have a job sitting and developing ideas they would have thought that is what they want as that is what they enjoyed as a kid. Most creatives have had other jobs before and so they know what a good job they have.

Money is a motivator but the key is the feeling of satisfaction of developing a great ad. You go to a party and people ask you what you do and you mention a great ad you

have developed and they know it. This fact that they reach people and do things that affect them and are remembered by large numbers of people is the key motivator. The key test of whether an ad is any good is the water-cooler test. 'Do people talk about the ad around the water-cooler at the office the next day'.

Detergent ads treat the consumer as stupid – typecast. The client forgets that they are the consumer. The consumer is the career person with two kids. They seem to put on a different hat when they go into work and forget who they are. What is a better ad is the JIF ad – woman scratching the inside of the glass – issues in terms of remembered the brand however recall problem may be due to there not being a USP, a link between their brand and the message. The original JIF ad have a strong link between the unique selling proposition and the creative concept - the ice-skate on the tub. With the new ad they are using that same link – scratching – but it maybe too vague – too distant a connection.

Q. What motivates you?

The awards. Having great ads recognized. The advertising industry is great as when you do something great people know it and recognize it.

Potential to look at the reward system in agencies. High levels of idea rejection that is not due to individual creative inability but more related to client factors. This can not itself be changed as creatives need to quickly learn what clients like and do not like and this is a differentiating factor in determining whether a creative makes it in the industry (negative reinforcement), however good work could be recognized more strongly within the agency. Already done to some extent with good ads up on the walls, in the lift etc, however a big motivational issue is the external recognition that a great ad achieves, this could potentially be enhanced to act as a strong positive reinforcement and motivational factor.

Q. What motivates you as a creative?

She enjoys the job. You get to develop ideas and there is both internal and external satisfaction from this, but you need to get the internal satisfaction as you might develop one hundred ideas and the creative director might just select one of those which is then rejected by the client. She knows people who work at Saatchi's from

nine until ten o'clock or midnight. Here it is not so bad although you are still often thinking about an idea after work – still working.

Awards are a good motivator but they come only once a year.

Q. What do you think of deadlines/motivational factors?

Deadlines are needed. He is working on a project currently that has no deadline currently and this is very frustrating – people are not delivering on a fixed area as they know they do not have to.

Money is a big motivator. The industry is overpaid for what it is – although he is happy about this. Young guys can earn very good money for doing what secretly a person without a high IQ could do.

The creative director has a large influence on the creative direction of the agency. He is the one that links the creatives with the client and decides on the ideas that are run with. This is a funny agency – theme. More so than other agencies he has worked with. The creative director sets the theme – direction is critical. His experience is what counts.

Q. What do you think of deadlines?

She needs them. If given three weeks for something they still leave it until the night before to develop ideas. Needs to have a lot of things going on at once.

This is very interesting. I myself find that often the most creative times are when there are a lot of pressures to achieve something in a short period of time. At the same time without breaks the mind does not recover from these periods of intense work and stress. It may be creative people have to work in short bursts of extreme intensity followed by periods of relaxation.

Q. Is any evaluation good evaluation?

They are doing evaluation all the time. From when they first start to generate ideas and bounce them off each other, evaluation is happening – through to the other creative teams and the creative director evaluating the ads. However pre-tests and other quantitative measures are not good. How can a carton representation of an ad with a voiceover reflect the consumer response to a final product. Kid asks – “is it all a carton?”. Also you get artificial levels of attention in these tests. It is not like looking at a TV ad at home. You also get groupthink – one person likes it so they will

say they do. Often simpler version of an ad will research/test better – *Company*
 Xexample – made one ad –client asked for a second execution with very little time –
 developed a simpler version – it tested well. Client went with it and it was not
 successful.

It is frustrating when the client does not understand the process. Example client
 meeting with brainstorming notes on the wall that had been developed extensively
 with many teams and sessions. Client says– “oh lets just work further and develop
 with these ideas”, as if they were ideas done in half an hour.

They could develop very creative stuff for the established client if they let them. The
 client needs to understand the creative process as well. The suit often does not
 understand the creative process. Selection of a good suit is an area that needs looking
 at.

Q. How do you find the evaluation process?

It has its role – if it supports your idea then it is great if not then it is not good.
 Generally not a good thing.

Q. What do you think of evaluation in advertising?

There are award books. Difficult to evaluate creativity.

Q. How do you find the evaluation process?

Evaluation – when people evaluate an idea and the idea is a good idea they know it
 in their gut. They do not need a test to know this. However when testing does occur it
 often kills the idea as it does not fit nicely into those limited testing measures. Testing
 and research is a negative.

Q. No such thing as a good research. Evaluation should be done by the client, the
 person who has the authority to make the decision on whether the ad should run or
 not. Research is used by some clients as a means to protect themselves especially if
 the brand manager does not have the confidence to make the decision. Good brand
 managers/clients have some things they are looking for in an ad but are able to make
 the decisions themselves without using research tools. Example – the current
 McDonald’s brain ads would not have made it through testing.

Q. Have to be willing to accept that good ideas will be shot down. Get angry for half an hour and then get on with it. Other people – the client – do not have to be able to accept rejection all the time.

Talked about the need for lateral thinking – did not think this could be taught. New creatives often write all their ideas down and present them to the client, they (experienced creatives) know which are the good ideas and get a feel for which ones to move forward with, which ones to take to the client and which not to.

It seemed apparent that for the creatives domain specific knowledge is a potential problem. Talked about people who look at advertising award books and imitate them and while for some it works often it results in old stale advertising. Good for a new creative to look at award books but they still need to think laterally for themselves – develop their own ideas – cross memory categories.

Creativity requires a person to be able to apply their own ideas – emphasis on thinking for themselves.

Q. Is any evaluation good evaluation?

Ideas should not be shown to other creatives, of course you must show it to the creative director, but most, although not all, creatives are very good at the big leaps, (it is an area where he is strong) and therefore you show an idea to a creative and they will see it while a customer on the street will not and you will know you have to tighten it up.

He has had little experience with formal copy testing.

This is interesting as most creative do not like the evaluation process, especially the use of focus groups and pre-testing of copy. The problem with evaluation is probably less to do with the evaluation per se, and more to do with the inadequacies with the testing methods available in NZ. Creatives and clients both have the problem of needing some sort of evaluation prior to the very expensive process of full ad production and media purchase, however limited access to good testing methods in NZ and problems with the options that are available means that the more reliable method is the experiential knowledge of experienced creative directors and brand managers. Given an ever changing market and differences between the evaluation

criteria of these people and the market, as well as problems with experienced risk adverse brand managers, it would be of significant value if there were better testing methods available in the NZ market.

Q. Would more consumer research assist in your briefing information?

You mean like focus groups?

Q. No, more quantitative consumer surveys using projective techniques so that the consumer does not know directly what you are asking about?

They could be useful if the consumer does not know what they are talking about, if they (the consumer) do they just give you what you want to hear, there is little motivation to think about it. I have answered surveys and you say whatever you want without thinking about it.

Q. Is any evaluation good evaluation?

Like most creatives she will say this – does not like evaluation. Been in a focus group and everyone feels like they have to say something to criticize it. Also you get a loudmouth and they talk loudly and everyone follows that person's lead.

Q. What is the creative process you go through?

Use a variety of techniques such as scenarios. They also generate negative ideas to get them out there so they would not dwell on them and have them limit new ideas. Sky sex channel example – start with all the bad sex jokes, tissue boxes etc then what is left to work with? Go back to the problem – Need Plan B leads them to if you cannot score Plan B is the Sky sex channel.

Important to jot down ideas to come back to. Think of different ways to approach the problem – different words.

Difficulty articulating the creative process they go through.

Q. Different question – can creative thinking be taught?

Evaluation is an issue. Sit thinking of ways to sell the ideas to people. No good taking an idea to the creative director and saying it is funny if he/she cannot see it.

Too much information in the brief limits their creative thinking. The suit needs to think like a creative. More consumer research would not help. It is difficult for a new

client with a product category that they have not dealt with before but if not they know what the client wants and what a car does.

Company XMoro example – targeted at energy but taken over by bars and drinks needed to reposition but unwilling to do so, therefore got uncreative ads.

Q. What is the creative process you go through?

It starts with writing the ideas that spring to mind down. Often these are the good ideas. He will also develop mind maps on a piece of paper to develop ideas. He uses techniques such as looking at award books and thinking about how those ideas were developed – not the final idea but the process, the thinking that went into getting to that idea, then he applies this to the problem he has.

Technique – think of things from the customer's perspective. If they are not an actual customer of that product then they go and find someone who is. Do not sit down and read about that type of person, better to talk to someone and get the experiential information from them. Uses this technique often.

Interesting to see the same type of forced divergent technique using the customer as the base. This is a common theme, which is not surprising given the strong need for advertising to be able to connect quickly with the customer. However while creatives may be able to develop strong cross category links using customer based techniques, their ability to evaluate these ideas may be limited if they are not the target audience. This may be a problem that results in clients rejecting highly original but inappropriate advertisements. From the creative's perspective their evaluation of those ads will be based upon their own points of reference and therefore it may be difficult to understand the evaluation criteria that were used to reject the idea. It may be that these customer based insights need to be more strongly reflected in the brief. However this will also be problematic as the creative is looking for the one central theme in the brief and too much information may itself the ability to cross memory categories.

Q. What is the creative process you go through?

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

FMCG companies are less receptive to creative ideas – they often want the same old message and unique selling proposition (USP) reinforced again and again. Service firms are more able to accept new and different ideas. Reasoning – service firms needing to build relationships with customers rather than pushing a good.

It is important not to try thinking all day and night about an idea. Started by doing this, but the mind needs to rest. Yet for new creatives they are worked long hours, milked for new ideas and paid peanuts. If the motivational support and encouragement is not there they will not keep on doing it.

The agency is important. This agency is quite structured and hierarchical which is a good and a bad thing. Bad in that they want you to be in your office all day and this may limit creativity, as you need to be exposed to different environments, also there is the concern and attention given to the big client who is often not pushing for highly creative material. On the positive side if a team needs to move a project on to another team they can (the resource is there). They move an idea on when they have an idea which they know is a good idea (gut feeling) and it is not accepted – then it is hard to keep on generating new ideas as they know they had the right idea.

Did not think that the creative process could be analysed. Did not use any particular techniques, knew the USP and developed ideas from there. Important to develop the idea and then appropriate executions could be formulated from there i.e. 30 minute workout – Plastic hand in pregnant woman's hand, plastic head in hairdressers. Their creative process varied often, no given structure, given techniques. Felt it was difficult to talk about the creative process, as it was not a process that could be made a science of, although corporate executives want to do so.

Had ideas about what was not appropriate – vulgarity or sexual imagery used to cover for a lack of a good creative idea.

Frustrating talking about creative thinking process as it is not something you can make formulaic.

Every student seems to get a marketing degree but then wants to apply a formula and cannot develop ideas for themselves.

Q. Get the brief and develop ideas from the key concept – Example – the History Channel ‘What is History all about’ (Winston Churchill in his underwear). Did not think this was big leap thinking was being made but actually it was. Emphasis on humour in advertising (NZ cultural element).

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

Q. What is the creative process you go through?

Goes through a process of generating ideas based upon the brief and the one idea, then relates that to the product i.e. telephone – related words, *moves down the level of association*, a person using a telephone, what does a person do with a telephone etc.

Q. What do you do when stuck for an idea?

Do not panic. Other creative teams do – rant and rave. They just go back to the problem and keep on generating ideas. They have never not had any ideas – always a good idea even if it is not a great one.

Q. What is the creative process you go through?

Research lots of research. Example: working on a campaign for party pills at the moment, search on the internet for drugs, night clubs etc. Gets a lot of research information and this helps her think of ideas – information on both the product and the users.

Q. What do you do when stuck for a creative idea?

Go back to the idea – either add to it or not add anything. Sometimes it is a matter of not needing to add anything – the idea is there and good in itself. Some people add crazy material to an idea just because they like that font... It is important for an ad to

have one central concept. It is a matter of then getting things (*the design*) to work with that idea. It may seem strange but there is a combination that works, the right art, the right font etc. The simple central idea all working with the artistic aspects.

Q. What do you do when stuck for an idea? (having difficulty generating a creative idea)

Creative blocks – it was not a matter of them having creative blocks, but ideas that they knew were good ideas being stopped by the client. This meant it was difficult to develop new ideas on that project.

Q. What do you do when stuck for an idea?

Work on something else and come back to it later. Sleep on it if possible. Find some quiet space and think – which is difficult around here, the white room is often booked.

Q. Do you think creative thinking can be taught?

What makes a good ad maybe. One of the things they remember being said by a senior creative when they were new, was; “we will both have the same number of ideas I will know which are the good ones and you will not”.

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

Today what is exciting is the range of new media and new ideas that are needed. The target consumer is often not sitting around watching TV and they need to not only generated ad ideas but new ideas about the media as well. A new dimension – demanding, exciting.

They (their team) often get these types of new projects.

The Bud idea – what is the outcome of too much drinking – cards asking for forgiveness – CD goes to top 10, new idea.

Q. Do you think creative thinking can be taught?

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

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.

Q. Do you think creative thinking can be taught/improved?

The schooling systems had a large influence on their current jobs. A primary school that supported creativity and treated them as people not children. Not fitting into the rigid structure of the corporate world – the personal assistant that has to spell every word correctly. Most of their best ideas do not make it out there. They are still rewarding, it is exciting to develop, come up with new ideas even if the client does not accept them. A lot of good ideas sitting there in the bottom draw waiting for the right time.

Q. What do you think of deadlines?

Deadlines –hates them, always has. There is the need to keep thinking about an ad but at the same time you then have to meet the deadline – come up with something to meet the deadline.

Q. Did you have any formal creativity training?

He did not learn any creative thinking techniques, he did not have formal training. Did the courses, what an advertising executive does, what a creative does, what is advertising etc, but the creative thinking course was very basic – write down your ideas straight away, put six boxes on a page and develop six different ads. If he were asked to do that these days he would put down three boxes as he knows three of them would not be accepted.

Had arts training but has learnt a lot in the job very quickly.

Humour is important and used as people can connect to it. The sky ads are a good example of this – the two guys are funny.

Q. One or two months of training. Just learnt the structure – i.e. what is a brief etc.

Did not learn creative thinking techniques. Do not think that school's are as effective as on the job training. Better to come and work for a good advertising agency for nothing for a year rather than pay high tuition fees on a school based programme. Too much knowledge of an area in itself limits creativity.

Q. Have you had any formal creativity training?

Yes, did a course, very intensive, 9-5 taught how to handle deadlines, briefing documents, some basic creative thinking techniques, visited agencies.

Q. Have you had any formal creativity training?

Yes did a one year course that was very intensive 9-5 and they taught some techniques such as putting one hundred ideas down on a piece of paper. Still uses that technique in a way but now more focused, better at it. Learn a lot more on the job, and from the people here. That is why it is so important people are enthusiastic. They think it is one year training and then you are earning lots of money, but once you start you do a one year internship for nothing and then you do not earn much until you are a senior creative.

Q. Discussion of the holistic approach to ad development?

He thinks his role and job will become more valued into the future.

Q. Are some clients better than others?

Yes, '*Company X & Y*' are awful. The larger companies tend to be less good. Sky is an exception. It may depend upon the product as well.

Q. Do you have any creative outlets outside work?

No, he used to draw, 95% of his friends are outside the industry and it is good to get away from work.

Other

He has a good memory meaning he was good at math but waggled a lot.

Comes from a creative family, said he would not get into this field but here he is.

Did not go so well at school only passed half her school C papers, and did not get bursary but not a matter of intelligence just not wanting to learn their way – not strong on memorization.

Does painting outside work not very good at it but uses it to relax.

People research weak ads

Company X is chocolate it could be great ads.

The bigger client often gets the uncreative stuff.

Interview with Pete (Most Senior Creative at DDB, NZ)

43 years experience in advertising – Senior Creative

One of the few senior creatives I have interviewed who was able to articulate his creative process highly effectively.

Creativity is not a science. It is inherent with one person not having more creative potential than another.

Creativity starts with the Universe – everything is there, it is a matter of recognizing that information that is there – the links that exist between information.

Step 1 CREATION - DESTRUCTION
 Positive - Negative

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. *A very good tool, which is a type of forced divergence technique allowing him to think about information from a very different angle.*

Step 2 Inherent Truth

There is always an inherent truth to a situation, something which all people recognize and can relate to. The second stage is to look at the client product and determine the inherent truth for their message. This information may be in the brief or it may have to be thought through by the creative.

As people we have developed so many words to describe our emotions or feelings (the inherent truths). If I were to say Romance to any group of people there would be words to describe it – they would all understand it.

Step 3 One Word

Determine the one word that sums up the key message that needs to be portrayed. It is important to keep things to one word, to keep it simple. All the best award winning advertising, if you look at award books, has this simple one word.

This is a common thread across a number of the interviews as well as the observation of portfolio classes run by senior creatives. Good advertising is able to identify the key message that needs to be portrayed and then make novel links between the one word and the elements of the advertisement that attract the attention of the target audience. Advertising as a medium requires this approach.

Cat Food Brief – only one sentence in the brief that matters the rest is too much information. From that sentence he gets the one word – Choice.

Critical that the one word is exactly what the client wants – research.

From there the journey is made. The cat with a menu. This idea is not seen as a leap, as he stated anyone given 15 minutes in a room would come up with menu for choice.

Then the positive and negative technique can be used. Example Volvo what is bad about the Volvo - a brick (Volvo). Illustrates the inherent truth of safety.

Step 4 Take the Journey

Sit down and put in the effort to thinking about how to link the one word with the wider message. Let the mind think about those connections.

Step 5 Fill the Head with Information

Get information either from other memory categories or from external sources to assist the journey.

Step 6 Think like a human.

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. Provides both an effective method to bring in information from different memory categories and ensures the message connects with the consumer. The different stages in the process is a very clever and well developed technique for generating ideas as it provides a wide range of memory links and can tie into the key emotions felt by consumers at the different stage of consumption. Additionally it ties into the concept of the inherent truth, in that the message can then tie in with emotional states the majority of consumers will feel when in different stages of the consumption process.

Step 7 Look for the Obvious

Try to look at the information that has come through in the journey and find the simple links that you may have overlooked when trying to look too deeply at the problem.

Example **Amsterdam**

Belfast

B.A. 3 x per week

The best ideas do not make it.

Deadlines are just an excuse. If only we had more time, more money etc. If only I had another week I would have won the marathon, we all make these excuses, even myself. The creative process still needs to happen, it can still happen irrespective of those resource limitations.

Looking for the simpler connections between thoughts or concepts. This again is a good approach that is well suited to the advertising environment. It requires the creative to stop the idea generation process and evaluate the ideas already generated using a method that will result in small leaps between ideas to be identified. These types of leaps will be able to be formatted into advertising the consumer will understand in the context of an advertisement.

Ideas will be rejected but we are people, we are adaptable and we need to get on with it.

If he were to minimize what is important in the creative process above it would be the 'inherent truth', the 'one word' and 'look for the obvious'. Everyone takes the journey and fills their head with information.

One of the key issues with creative thinking may be in this statement. While, as he stated, everyone has the ability to make the journey and fill their head, the biggest limit to creativity that comes through in the research is motivation. Those two steps of taking the journey and filling the head with information, while everyone has the potential to do them and hence be creative, very few people do so. His strong creative abilities and those of other senior creatives may not only be in the skill and expertise

they have in their cross memory category linking but also the strong motivation and determination they put in to making the journey. Another interview stated the reason that many creatives leave the industry was that they do not get the encouragement – the emotional support and motivation. All creatives spoken to state that their most creative ideas – their best ideas – do not make it. Also that they have to be willing to accept constant rejection of good ideas and get on with it. The motivational aspects may therefore be critical for long-term success in the industry. The willingness to take the journey, which is cognitively very taxing, despite the low rate of success in taking that journey.

This also ties in with the techniques he uses to develop ideas. A frustrating aspect of the advertising industry for highly creative people may well be that their most creative work does not make it to market. The reason is probably that these ideas are too complex, (the memory connections too broad) for the advertising medium, that has to get a message across in a very limiting medium. His techniques

Step 6 – Looking at things from the customer’s perspective at different stages in the consumption process

1. Desires – I want
2. The anticipation
3. The act itself and the feelings from the act
4. The after consumption satisfaction – the cigarette after sex

Even a product I am not the consumer for I will have some knowledge on it. Tampons – the concern, the stress. We can also get information from other consumers (other people, reading books etc)

Critical briefing information – consumer based inherent truth, then the creative can make the leaps out from there.

He uses these techniques to think differently – to assist in the journey.

We all naturally fill our heads with information.

Starts with the universe – everything is there, we do not create new information – we put it together.

He does not think the process differs from FMCG and Consumer Durables or Automotive. It all starts with that inherent truth and the one word. We can not go beyond the one word it becomes too complex.

We can all think of things from the positive and negative sides. The negative is often funnier

Negative – what are the bad things about this product – how could we portray it using words that are not positive. Inherent truths but negative – Moro bar – fat

Appendix 2: Pre-Test Response Booklet

Response Booklet Instructions

Instructions: You have been asked to develop three creative magazine advertisements for a new brand of fly spray that is soon to enter the New Zealand market. The fly spray's competitive advantage is that it is extremely rapid kill. The target market is young adults, both male and female, between the ages of 18 and 32. You have one hour (60 minutes), to come up with three creative advertising concepts (20 minutes each). Please spend the first five minutes developing and listing as many different creative ideas as possible on the first page of the booklet. Then select the best creative idea as the main concept for development during the next fifteen minute period. For a non-advertising example, if I were asked to 'develop creative uses for a brick', the ideas that come to mind might be;

1. use it to smash a window
2. use it to smash a glass table
3. use it to prop up a leaning table
4. use it to block up a very small window

I would list all of the ideas down either pictorially or as a written list and select the 'use it on a wet path to keep my feet dry' as my chosen creative idea to develop in more detail. The number of ideas that you choose to generate or the amount and type of detail you provide on your selected concept is up to you. You have 15 minutes to develop your chosen idea and there are no correct or incorrect responses.

Response Booklet Instructions

Instructions: You have been asked to develop three creative magazine advertisements for a new brand of fly spray that is soon to enter the New Zealand market. The fly spray's competitive advantage is that the chemical contents break down after they come in contact with air, within a period of 30 minutes leaving no harmful chemical residuals. The target market is young adults, both male and female, between the ages of 18 and 32. You have one hour (60 minutes), to come up with three creative advertising concepts (20 minutes each). Please spend the first five minutes developing and listing as many different creative ideas as possible on the first page of the booklet. Then select the best creative idea as the main concept for development during the next fifteen minute period. When developing your creative advertising idea please use the key word provided on the cover page for each concept to help you to develop your ideas. For a non-advertising example, if I were asked to 'develop creative uses for a brick?' And the key word was 'WATER', the ideas that come to mind might be;

5. use it to splash a person who was walking past a lake
6. use it on a wet path to keep my feet dry
7. use it to dam up a very small stream
8. use it to plug a hole in a dam

I would list all of the ideas down either pictorially or as a written list and select the 'use it on a wet path to keep my feet dry' as my chosen creative idea to develop in more detail. The number of ideas that you choose to generate or the amount and type of detail you provide on your selected concept is up to you. You have 15 minutes to develop your chosen idea and there are no correct or incorrect responses.

Cover Page for Creative
Advertisement One (1).

Please do not write your ideas on this page.

Please feel free to use as many or as few of the next
four pages as you need in developing your
first Creative Advertisement

Key Word One – STONE.

Please remember to:

- List your first set of creative ideas on page three (3)
- Use pages four to six (4-6) to develop your first chosen creative advertisement
- Use the key word (STONE), to assist you in generating your creative ideas.

Page 1 for Creative Advertisement One
Please list your creative ideas on this page

Creative Ideas Page

Page 2 for Creative Advertisement One
Please use this page to develop your selected idea

Selected Idea 1 - Development Page 1

Page 3 for Creative Advertisement One
Please use this page to develop your selected idea, if required

Selected Idea 1 - Development Page 2

**Page 4 for Creative Advertisement One
Please use this page to develop your selected idea, if required**

Selected Idea 1 - Development Page 3

Cover Page for Creative
Advertisement Two (2).

Please do not write your ideas on this page.

Please feel free to use as many or as few of the next
four pages as you need in developing your
second Creative Advertisement

Key Word Two – FROG.

Please remember to:

- List your second set of creative ideas on page eight (8)
- Use pages nine to eleven (9-11) to develop your second chosen creative advertisement
- Use the key word (FROG), to assist you in generating your creative ideas.

Page 1 for Creative Advertisement Two
Please list your creative ideas on this page

Creative Ideas Page - 2

Page 2 for Creative Advertisement Two
Please use this page to develop your selected idea

Selected Idea 2 – Development Page 1

Page 3 for Creative Advertisement Two
Please use this page to develop your selected idea, if required

Selected Idea 2 – Development Page 2

Page 4 for Creative Advertisement Two
Please use this page to develop your selected idea, if required

Selected Idea 2 – Development Page 3

Cover Page for Creative
Advertisement Three (3).

Please do not write your ideas on this page.

Please feel free to use as many or as few of the next
four pages as you need in developing your
third Creative Advertisement

Key Word Three – WINTER.

Please remember to:

- List your third set of creative ideas on page thirteen (13)
- Use pages fourteen to sixteen (14-16) to develop your third chosen creative advertisement
- Use the key word (WINTER), to assist you in generating your creative ideas.

Page 1 for Creative Advertisement Three
Please list your creative ideas on this page

Creative Ideas Page - 3

Page 2 for Creative Advertisement Three
Please use this page to develop your selected idea

Selected Idea 3 – Development Page 1

**Page 3 for Creative Advertisement Three
Please use this page to develop your selected idea, if required**

Selected Idea 3 – Development Page 2

**Page 4 for Creative Advertisement Three
Please use this page to develop your selected idea, if required**

Selected Idea 3 – Development Page 3

Appendix 3: Pre-Test Information Sheet for Participants

Note: One page only.

Title of Project:

The Creative Process: Domain Specific Knowledge Effects on Creative Thinking

2. Researcher(s) name and contact information:

Mark Kilgour, Ph (65) 6372 1560 Mobile (65) 90056 654, Email: kilgourm@hotmail.com

Supervisor's name and contact information:

Dr Scott Koslow, University of Waikato, Management Department Ph 838 4466 ext 8587

Outline of the Project

This is an independent research initiative with the aim of determining the effect of existing knowledge on our ability to generate creative solutions.

Study Requirements

This aim of this study is to identify ways in which the creative thinking process can be improved. It is looking into aspects of the creative thinking process in general and is not testing individual creative thinking abilities. Therefore the names and specific demographic details are not required for the study. Subsequently respondents will remain anonymous.

Participation in the Study

Any participation in this study is up to the individual and participants are able to withdraw from the survey at any time. The researcher, or a research assistant, will be available during the research phase of the study to answer any questions participants may have. All aggregated (not individual data), findings will be released to the advertising agency prior to any publication of major findings.

Use of Study Findings

No individual data will be available to anyone but the researcher and research assistant. All individual data collected will be kept confidential. Data will be collected and collated using a statistical software package. The researcher or research assistant will interpret, collate and input the data. As personal details will not be required, only the primary researcher (the person in contact with participants directly) will know individual participants. The data will then be analyzed using summary statistics and analysis of variance. These aggregated results will then be interpreted and used as the basis for supporting or refuting of the research hypothesis.

**WAIKATO MANAGEMENT SCHOOL
APPLICATION FOR ETHICAL APPROVAL**

Outline of the Research Project

(for the benefit of the Waikato Management School Ethics Committee)

*Not more than **two** pages
Use clear and simple language
Technical terms should be avoided wherever possible*

1. Title of Project:

The Creative Process: Domain Specific Knowledge Effects on Creative Thinking

2. Researcher(s) name and contact information:

Mark Kilgour, 49 Spotiswoode Park Rd Oakwoode Heights Singapore 88643

Ph (65) 63721560 Mobile 90056 654

Email: kilgourm@hotmail.com

NZ Contact Details (17 Tahatai Rd Oneroa Waiheke Island, New Zealand, Ph (09) 372 7967)

3. Supervisor's name and contact information:

Dr Scott Koslow, University of Waikato, Management Department Ph 838 4466 ext 8587

4. Brief Outline of the Project (what is it about and what is being investigated):

The aim of the study is to determine the effect of a person's existing knowledge on their ability to generate creative solutions. It has a number of specific objectives;

1. To demonstrate the influence of domain specific knowledge on creative thinking
2. To illustrate the difference views of creative thinking and their implications for measurement and identification of creative ability
3. To develop and apply a working model of creative thinking
4. To illustrate the impact of creative thinking techniques on the process of
 - a) Originality measures of creative thinking
 - b) Appropriateness measures of creative thinking

5. Methodology:

The standard research steps will be followed

- 1) Secondary data collection and analysis – The Literature Review
- 2) Primary data collection to test the effects of domain specific variables on divergent and convergent thinking
 - a. Qualitative data collection – Exploratory Research
 - i. Observation of advertising agency creative idea generation methods
 - ii. Open ended questionnaires for key advertising agency personnel
 - iii. Development and pilot testing of the quantitative survey questionnaire

- b. Quantitative data collection
 - i. A two group randomly selected classical experimental design will be administered to remove selection and inter-group bias
 - ii. The sample size will depend upon access to personnel and resources. It is envisaged that a random sample of a major advertising agency will be attained.
- c. Data compilation and Analysis
 - i. Data will be analyzed using factor analysis to isolate the influence of the various variables under study (the domain specific knowledge measures)
 - ii. A sample test will be conducted to determine the confidence level of the data
 - iii. Hypothesis testing will be undertaken to evaluate the risk of type A and B errors
 - iv. Analysis of the variance will also be reviewed

6. Expected Outcomes of the Research:

Development of a working model of creative thinking

Results to determine the effect of domain specific effects on the creative thinking process

7. How will the participants be selected and how many will be involved?

Participants will be from a major advertising agency

An appropriate sample will be selected probably in the vicinity of >60 participants

8. How will the participants be contacted?

Participants will be contacted via the internal communication lines within the organization i.e. email, intranet, telephone

9. Explain incentives and/or compulsion for participants to be involved in this study.

As part of a study that will assist advertising agencies to understand the creative process better the results will provide valuable information to the agency. Subsequently management may encourage participants to become involved in the research.

10. How will your processes allow participants to:

- a) a) refuse to answer any particular question, and withdraw from the study at any time
- b) b) ask any further questions about the study, which occur during participation
- c) c) be given access to a summary of the findings from the study when it is concluded

Participation will first consent to be part of the study and a cover letter describing the requirements of participants and their ability to withdraw from the survey will be provided. The researcher, or a research assistant, will be available during the research phase of the study to answer any questions participants may have. All findings will be released to the advertising agency prior to any publication of major findings.

11. Explain how any publications and/or reports will have the consent of participants, and how the anonymity of participants will be protected.

All participants will be informed of their involvement in the study and individual personal details, other than general demographic data, will not be collected. All results will be collated and only summary statistics will be used as the basis for reporting, except in the case of exploratory research. However as with the case for the final survey, individual data, other than general demographic data, will not be collected for exploratory research purposes.

12. What will happen to the information collected from participants

Data will be collected and collated using a statistical software package. The researcher or research assistant will interpret, collate and input the data. As personal details will not be required only the primary researcher will know individual participant details. The data will then be analyzed using summary statistics and analysis of variance. Results will then be interpreted and used as the basis for supporting or refuting of the research hypothesis.

The University of Waikato
Waikato Management School Ethics Committee

Application for Ethical Approval of Research

COVER SHEET

Name ___Mark Kilgour Department _Marketing and International Management

Email address kilgourm@hotmail.com_ Phone Number: (65) 900 56 654

Mailing address: 17 Tahatai Rd Oneroa Waiheke Island (Auckland) New Zealand

This is an application for ethical approval of: (tick one)

- Research project involving data collection from Human Subjects
- Course which involves student projects that collect data from Human Subjects
- 499/599 which involves data collection from Human Subjects

Supervisor's Name: Dr Scott Koslow

Supervisor's approval (signature)_____

Project Title: The Creative Process: Domain Specific Knowledge Effects on Creative Thinking

- I request approval for this research and attach documentation pertaining to the items suggested in the Procedures for Ethical Approval of Research.**
- I have read and complied with the University's Handbook on Ethical Conduct in Research 2001, pages 8 to 15.**

Principal investigator's signature ___Mark Kilgour

Date _14 May 2003

WMS Ethics Committee Action

- Approved Convenor's signature

- Request modifications Reviewer's signature

- Request application Reviewer's signature

- Forward to University committee** **Dated** _____

Appendix 4: Pre-Test Instruction Sheet

The aim of this study is to evaluate the quality of ideas that are generated under different instructional conditions. Please read the instructions on the front page of your booklet carefully. Once you have read the instructions please generate a creative TV advertising concept for the product category provided. Please feel free to express your ideas either pictorially or in written form, or a combination of the two.

Please write down ALL the ideas that come to mind, but select the best creative TV advertising concept as the main concept in each of the fifteen minute periods. For example, and this example is not related to the development of an advertising concept as this might bias the results, but it does demonstrate the way we would like ideas to be recorded. If I were told to ‘develop creative uses for a brick?’ The ideas that come to mind might be;

1. use it to smash a window
2. use it on a wet path to keep my feet dry
3. build an ant house
4. block up a very small window

I would list all of the ideas down either pictorially or as a written list and select the ‘Ant house’ as my creative concept to develop in more detail. The number of ideas that you choose to generate or the amount and type of detail you provide on your selected concept is up to you. You have 15 minutes to develop your ideas and there are no correct or incorrect responses.

Appendix 5: Waikato Management School Application for Ethical Approval

Outline of the Research Project

(for the benefit of the Waikato Management School Ethics Committee)

*Not more than **two** pages*

Use clear and simple language

Note* : This application is a variation on the ethics proposal that was approved last September (and the research conducted). The project methodology and instructions are the same except for the following changes;

- 1. A classification question has been added asking students to indicate whether English is their first language or not.**
- 2. The domain specific knowledge treatment has been changed from a ‘new’ product category to a ‘new’ customer category.**
- 3. The results will be used as a comparison with research conducted on advertising personnel rather than as a pre-test.**

1. Title of Project:

The Effect of Forced Divergence and Domain Specific Knowledge on Creative Thinking Outcomes

2. Researcher(s) name and contact information:

Mark Kilgour 838 4466 ext 7885 kilgour@waikato.ac.nz

Associate Professor Dr Scott Koslow 838 4466 ext 8587 skoslow@waikato.ac.nz

3. Supervisor’s name and contact information:

Associate Professor Dr Scott Koslow 838 4466 ext 8587 skoslow@waikato.ac.nz

4. Brief Outline of the Project (what is it about and what is being investigated):

Experiment to evaluate the effects of forced divergence creative thinking techniques and domain specific knowledge on creativity. This is a test of a student sample for comparison with a study that was undertaken at Saatchi and Saatchi’s New York office late last year.

5. Methodology:

Participants will be asked to develop three advertising concepts either for a familiar or an unfamiliar population, and using either no creative thinking techniques or a forced divergence creative thinking technique, depending upon the condition to which they are randomly assigned. Respondents will develop answers independent of one another so there will be no social pressure. Respondents will be informed prior to the study as to the reasons for the study and the fact that individual identification data is not required and will not be collected (refer Information for Participants Sheet attached). It is expected that approximately 150 students will be involved in the study. No anticipated physical or psychological risks are anticipated and debriefing will occurring during the study session immediately after the data has been collected.

6. Expected Outcomes of the Research:

Results will form the basis for a comparison between different sample populations; students, account executives and advertising creative personnel, and they may form the basis of a journal paper when combined with the subsequent research. The results will also contribute to a doctoral thesis

7. How will the participants be selected and how many will be involved?

The participants will be students enrolled in the Marketing Research paper MKTG352-05A and the Advertising and Promotional Strategy MKTG452-05A. The research will be conducted during one of the class sessions. The first half of the session will involve students undertaking the experiment. During the second half of the class session a debrief of the study will be discussed with students to assist in their course learning outcomes.

8. How will the participants be contacted?

During course lectures

9. Explain incentives and/or compulsion for participants to be involved in this study.

The study will act to provide a practical application of marketing research and developing advertisements. The research does not require any individual identification details (i.e. participants names or student identification numbers) to be collected and the results from the study will be available to use as the basis for class discussion of research methods.

10. How will your processes allow participants to:

- a) a) **refuse to answer any particular question, and withdraw from the study at any time**
- b) b) **ask any further questions about the study, which occur during participation**
- c) c) **be given access to a summary of the findings from the study when it is concluded**

The researchers will be present during the study to answer any questions participants may have. If participants choose not to complete any, or all, of the study, then their data will not be collated as part of the aggregate results. Aggregate results will be made available for students if they want to further analyze the results for study purposes. No individual responses will be made available to participants as individual identification information is not collected and subsequently which results are attributable to each participant is unknown. Participants can choose whether they participate in the study or not, irrespective of their participation they will have access to the aggregate results and the discussion of the experimental design, to assist in their understanding of research methods.

11. Explain how any publications and/or reports will have the consent of participants, and how the anonymity of participants will be protected.

Anonymity of the participants is protected as data on the identify of individual participants is not collected. Students will be informed prior to the study about the nature of study and that it is part of a larger study and possible journal articles.

12. What will happen to the information collected from participants?

The raw responses will be evaluated by two blind raters. Aggregate results will be statistically analyzed using an appropriate statistical package. As no personal identification data will be collected the anonymity of participants is assured. The original raw data (the creative advertising concepts) will be kept by the researchers and will be destroyed after a period of one year.

13. Anticipated date to begin data collection

11th April 2005

Appendix 6: Pre-Test Interview Guide & Schedule

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1. Allocate a number from one to four to each class member | 2m |
| 2. Separate conditions one and three (participants numbered one and three) from conditions two and four and have them move to a separate room | 2m |
| 3. Provide verbal instructions from sheet 1 to conditions one and three, and from sheet 2 instructions to conditions two and four | 1m |
| 4. Hand out response booklet – Content | 1m |
| i. Page 1 – Instructions | |
| ii. Pages 2-5 – space for ad concept 1 | |
| iii. Pages 6 – Cover page ad concept 2 | |
| iv. Pages 7-10 – space for ad concept 2 | |
| v. Pages 11 – Cover page ad concept 3 | |
| vi. Pages 12-15 – space for ad concept 4 | |
| 5. Ask the participants to read the instructions on the front page of the answer booklet and if they have any questions to ask. Instruct them to start when ready. Ensure a clock is visible | 2m |
| 6. After ten minutes inform participants that they have five minutes to finish writing down their ideas on the first creative advertising concept | 10m |
| 7. After a further five minutes ask participants to move to page six of their booklet and begin generating ideas for their second creative advertising concept | 5m |
| 8. After ten minutes inform participants that they have five minutes to finish writing down their ideas on the second creative advertising concept | 10m |
| 9. After a further five minutes ask participants to move to page twelve of their booklet and begin generating ideas for their third creative advertising concept | 5m |
| 10. After ten minutes inform participants that they have five minutes to finish writing down their ideas on the third and final creative advertising concept | 10m |
| 11. After a further five minutes ask participants to hand in their booklet | 5m |
| 12. Handout the self rating scale form (refer sheet 3) | 1m |
| 13. Ask participants to rate each of their three creative advertising concepts on the rating scales with a rating of one representing a very strong rating on the measure and a rating of seven being a very weak rating on the measure. Ask participants to be as objective as possible in their ratings. | 4m |
| 14. Collect the self-rating scale forms | 1m |
| 15. Thank participants and debrief (refer debriefing sheet) | 1m |
| | Total Time 70m |

Appendix 7: Pre-Test Self Assessment Rating Form

Please take your time to complete the following self-assessment rating of your advertisements

1. Using your own definition of originality how would you rate your three advertisements for their level of ORIGINALITY using the following 1-7 rating scale? A rating of One (1) would indicate you thought the advertisement was extremely unoriginal with a Seven (7) being extremely original

	Extremely Unoriginal					Please Circle		Extremely Original	
Your first chosen advertisement:	1	2	3	4	5	6	7		
Your second chosen advertisement:	1	2	3	4	5	6	7		
Your third chosen advertisement:	1	2	3	4	5	6	7		

2. Using your own definition of appropriateness how would you rate your three advertisements for their level of APPROPRIATENESS?

	Extremely Inappropriate					Extremely Appropriate	
Your first chosen advertisement:	1	2	3	4	5	6	7
Your second chosen advertisement:	1	2	3	4	5	6	7
Your third chosen advertisement:	1	2	3	4	5	6	7

3. Using your own definition of creativity how would you rate your three advertisements for their level of CREATIVITY?

	Extremely Uncreative					Extremely Creative	
Your first chosen advertisement:	1	2	3	4	5	6	7
Your second chosen advertisement:	1	2	3	4	5	6	7
Your third chosen advertisement:	1	2	3	4	5	6	7

4. How would you rate your three advertisements on their likelihood of gaining the attention of the target market audience?

	Extremely Unlikely					Extremely Likely	
Your first chosen advertisement:	1	2	3	4	5	6	7
Your second chosen advertisement:	1	2	3	4	5	6	7
Your third chosen advertisement:	1	2	3	4	5	6	7

5. How would you rate your three advertisements on their likelihood of convincing the target market of the benefit(s) of your product?

	Extremely Unconvincing					Extremely Convincing	
Your first chosen advertisement:	1	2	3	4	5	6	7
Your second chosen advertisement:	1	2	3	4	5	6	7
Your third chosen advertisement:	1	2	3	4	5	6	7

6. Using your own definition of effectiveness how would you rate your three advertisements in terms of their overall effectiveness?

	Extremely Ineffective					Extremely Effective	
Your first chosen advertisement:	1	2	3	4	5	6	7
Your second chosen advertisement:	1	2	3	4	5	6	7
Your third chosen advertisement:	1	2	3	4	5	6	7

7. Please use the scale below to tell us to what extent you agree with the statements in the table below. Please write the appropriate numbers in the boxes to the right of each statement for each of your three advertisements

If your answer is...	Strongly disagree	Disagree	Somewhat disagree	Neither	Somewhat agree	Agree	Strongly agree
Put this number in the box...	-3	-2	-1	0	+1	+2	+3

Compared to other advertisements for the product category you have seen, the three advertisements you developed were...	First Advert	Second Advert	Third Advert
...“on strategy – conveyed the competitive advantage benefits well”			
...original			
...a good fit with the strategy			
...imaginative			
...emotionally expressive			
...unexpected			
...novel			
...an appropriate strategy for the client			
...different			
...built on good strategy			

Part 2

Now, please tell us about yourself. Your responses will be used for classification purposes only.

Are you currently , or have you in the past, taken any advertising courses or worked in an advertising agency?
 No Yes

Are you: Male Female

Please rate the following three words as to their perceived degree of association to the words ‘FLY SPRAY’. A rating of one being the most closely associated word, with a three being the least closely associated word. As an example the words chair, cup and bear might be rated in relation to the word ‘TABLE’ as 1) Chair (table and chair), 2) Cup (table and cup) and, 3) Bear, (table and bear).

Please only use each number once

Stone ____ (1,2 or 3)

Frog ____ (1,2 or 3)

Winter ____ (1,2 or 3)

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY!

Appendix 8: List of Associative Words

1	FROG 1	SLEEP 2	WINTER 3
2	SMELL 3	TREE 1	STONE 2
3	DANGEROUS 2	MOON 3	SEAGULL 1
4	WINDOWS 1	LOG 2	WORM 3
5	CLEANING 3	LIGHT 1	DOVE 2
6	BREATHING 2	FLOWER 3	HOSE 1
7	HOME 1	MONEY 2	NEEDLE 3
8	DEAD 3	GUEST 1	HAIR 2
9	ENVIRONMENT 2	KNIFE 3	TOWEL 1
10	POISON 1	DREAM 2	WATER 3
11	SPIDER 3	CHAIR 1	WOMAN 2
12	FISHING/TOXIC 2	HURT 3	SHOE 1
13	DIRTY 1	BREAD 2	CAR 3
14	WALL 3	ANIMAL 1	PILLOW 2
15	KILLER 2	GREEN 3	CHEESE 1
16	SWAT 1	DOCTOR 2	SCHOOL 3
17	PEST 3	GLASS 1	RICH 2
18	IRRITATION/GUN 2	GOLD 3	GRAIN 1
19	DISEASE 1	FINGER 2	SAW 3
20	GAS 3	MOUSE 1	NAIL 2
21	TOXIC/ FISHING 2	BLACK 3	BOOK 1
22	WAR 1	EARTH 2	WHITE 3
23	FOOD 3	TOE 1	OCEAN 2
24	GARBAGE 2	DAY 3	PAIN 1
25	COST 1	FIRE 2	SWEET 3
26	PETS 3	ANGRY 1	CIRCUS 2
27	NIGHT 2	HIGH 3	THORN 1
28	GUN/IRRITATION 1	QUEEN 2	HOURGLASS 3
29	KITCHEN 3	TOMB 1	LOCKER 2
30	SUMMER 2	BOTTLE 3	OFFICE 1

Response Booklet Instructions

Instructions: You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the American market. The spray's competitive advantage is that the chemical contents break down within a period of 30 minutes leaving no harmful chemical residues. The target market is upper-middle class American consumers, both male and female, between the ages of 21 and 35. In the past the company used the concept of a disease-carrying cartoon fly called 'Fester', much like the 'Raid' campaign. This advertising concept has been unsuccessful.

You have 60 minutes, to come up with three creative advertisements. Please spend the *first five minutes* (of the 20 minutes allotted to each advertisement) generating and recording as many different creative ideas as possible on the page entitled 'Creative Ideas Page'. Then select the best creative idea as the chosen concept you wish to develop during the *remaining fifteen minute* period.

When generating your ideas please use the key word provided on each cover page to help you. As a non-advertising example, if I were asked to 'develop creative uses for a brick,' and the key word was 'WATER', the ideas that come to mind might be:

1. Use it to splash a person who was walking past a lake
2. Use it on a wet path to keep my feet dry
3. Use it to dam up a very small stream
4. Use it to plug a hole in a dam

First, I would list all of the ideas either pictorially or as a written list. Then I would select the idea, 'Use it on a wet path to keep my feet dry' as my chosen creative idea to develop in more detail. The number of ideas that you generate, and the amount and type of detail you provide on each of your three chosen concepts is up to you. There are no correct or incorrect responses.

Response Booklet Instructions

Instructions: You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the American market. The spray's competitive advantage is that the chemical contents break down within a period of 30 minutes leaving no harmful chemical residues. The target market is upper-middle class American consumers, both male and female, between the ages of 21 and 35. In the past the company used the concept of a disease-carrying cartoon fly called 'Fester', much like the 'Raid' campaign. This advertising concept has been unsuccessful.

You have one hour (60 minutes), to come up with *three* creative advertisements (20 minutes each). Please spend the *first five minutes* (of the 20 minutes allotted to each advertisement) generating and recording as many different creative ideas as possible on the page entitled 'Creative Ideas Page'. Then select the best creative idea as the chosen concept you wish to develop during the *remaining fifteen minute* period.

As a non-advertising example, if I were asked to 'develop creative uses for a brick,' the ideas that come to mind might be:

1. Use it to smash a window
2. Use it to smash a glass table
3. Use it to prop up a leaning table
4. Use it to block up a very small window

First, I would list all of the ideas either pictorially or as a written list. Then I would select the idea, 'Use it to block up a small window' as my chosen creative idea to develop in more detail.

The number of ideas that you generate, and the amount and type of detail you provide on each of your three chosen concepts is up to you. There are no correct or incorrect responses.

Response Booklet Instructions

Instructions: You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the French market. The spray's competitive advantage is that the chemical contents break down within a period of 30 minutes leaving no harmful chemical residues. The target market is upper-middle class *French* consumers, both male and female, between the ages of 21 and 35.

You have one hour (60 minutes), to come up with *three* creative advertisements (20 minutes each). Please spend the *first five minutes* (of the 20 minutes allotted to each advertisement) generating and recording as many different creative ideas as possible on the page entitled 'Creative Ideas Page'. Then select the best creative idea as the chosen concept you wish to develop during the *remaining fifteen minute* period.

As a non-advertising example, if I were asked to 'develop creative uses for a brick,' the ideas that come to mind might be:

1. Use it to smash a window
2. Use it to smash a glass table
3. Use it to prop up a leaning table
4. Use it to block up a very small window

First, I would list all of the ideas either pictorially or as a written list. Then I would select the idea, 'Use it to block up a small window' as my chosen creative idea to develop in more detail.

The number of ideas that you generate, and the amount and type of detail you provide on each of your three chosen concepts is up to you. There are no correct or incorrect responses.

Response Booklet Instructions

Instructions: You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the *French* market. The spray's competitive advantage is that the chemical contents break down within a period of 30 minutes leaving no harmful chemical residues. The target market is upper-middle class *French* consumers, both male and female, between the ages of 21 and 35.

You have one hour (60 minutes), to come up with *three* creative advertisements (20 minutes each). Please spend the *first five minutes* (of the 20 minutes allotted to each advertisement) generating and recording as many different creative ideas as possible on the page entitled 'Creative Ideas Page'. Then select the best creative idea as the chosen concept you wish to develop during the *remaining fifteen minute* period.

When generating your ideas please use the key word provided on each cover page to help you. As a non-advertising example, if I were asked to 'develop creative uses for a brick,' and the key word was 'WATER', the ideas that come to mind might be:

1. Use it to splash a person who was walking past a lake
2. Use it on a wet path to keep my feet dry
3. Use it to dam up a very small stream
4. Use it to plug a hole in a dam

First, I would list all of the ideas either pictorially or as a written list. Then I might select the idea, 'Use it on a wet path to keep my feet dry' as my chosen creative idea to develop in more detail. The number of ideas that you generate, and the amount and type of detail you provide on each of your three chosen concepts is up to you. There are no correct or incorrect responses.

Response Booklet Instructions

Instructions: You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the American market. The spray's competitive advantage is that the chemical contents break down within a period of 30 minutes leaving no harmful chemical residues. The target market is upper-middle class American consumers, both male and female, between the ages of 21 and 35.

You have one hour (60 minutes), to come up with *three* creative advertisements (20 minutes each). Please spend the *first five minutes* (of the 20 minutes allotted to each advertisement) generating and recording as many different creative ideas as possible on the page entitled 'Creative Ideas Page'. Then select the best creative idea as the chosen concept you wish to develop during the *remaining fifteen minute* period.

When generating your ideas please use the key word provided on each cover page to help you. As a non-advertising example, if I were asked to 'develop creative uses for a brick,' and the key word was 'WATER', the ideas that come to mind might be:

1. Use it to splash a person who was walking past a lake
2. Use it on a wet path to keep my feet dry
3. Use it to dam up a very small stream
4. Use it to plug a hole in a dam

First, I would list all of the ideas either pictorially or as a written list. Then I might select the idea, 'Use it on a wet path to keep my feet dry' as my chosen creative idea to develop in more detail. The number of ideas that you generate, and the amount and type of detail you provide on each of your three chosen concepts is up to you. There are no correct or incorrect responses.

Response Booklet Instructions

Instructions: You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the American market. The spray's competitive advantage is that the chemical contents break down within a period of 30 minutes leaving no harmful chemical residues. The target market is upper-middle class American consumers, both male and female, between the ages of 21 and 35.

You have one hour (60 minutes), to come up with *three* creative advertisements (20 minutes each). Please spend the *first five minutes* (of the 20 minutes allotted to each advertisement) generating and recording as many different creative ideas as possible on the page entitled 'Creative Ideas Page'. Then select the best creative idea as the chosen concept you wish to develop during the *remaining fifteen minute* period.

As a non-advertising example, if I were asked to 'develop creative uses for a brick,' the ideas that come to mind might be:

1. Use it to smash a window
2. Use it to smash a glass table
3. Use it to prop up a leaning table
4. Use it to block up a very small window

First, I would list all of the ideas either pictorially or as a written list. Then I would select the idea, 'Use it to block up a small window' as my chosen creative idea to develop in more detail.

The number of ideas that you generate, and the amount and type of detail you provide on each of your three chosen concepts is up to you. There are no correct or incorrect responses.

Response Booklet Instructions

Instructions: You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the French market. The spray's competitive advantage is that the chemical contents break down within a period of 30 minutes leaving no harmful chemical residues. The target market is upper-middle class *French* consumers, both male and female, between the ages of 21 and 35. In the past the company used the concept of a disease-carrying cartoon fly called 'Fester', much like the 'Raid' campaign. This advertising concept has been unsuccessful.

You have one hour (60 minutes), to come up with *three* creative advertisements (20 minutes each). Please spend the *first five minutes* (of the 20 minutes allotted to each advertisement) generating and recording as many different creative ideas as possible on the page entitled 'Creative Ideas Page'. Then select the best creative idea as the chosen concept you wish to develop during the *remaining fifteen minute* period.

As a non-advertising example, if I were asked to 'develop creative uses for a brick,' the ideas that come to mind might be:

1. Use it to smash a window
2. Use it to smash a glass table
3. Use it to prop up a leaning table
4. Use it to block up a very small window

First, I would list all of the ideas either pictorially or as a written list. Then I would select the idea, 'Use it to block up a small window' as my chosen creative idea to develop in more detail.

The number of ideas that you generate, and the amount and type of detail you provide on each of your three chosen concepts is up to you. There are no correct or incorrect responses.

Response Booklet

Instructions

Instructions: You have been asked to develop *three different* creative television advertisements for a new brand of household insecticide spray that is soon to enter the French market. The spray's competitive advantage is that the chemical contents break down within a period of 30 minutes leaving no harmful chemical residues. The target market is upper-middle class *French* consumers, both male and female, between the ages of 21 and 35. In the past the company used the concept of a disease-carrying cartoon fly called 'Fester', much like the 'Raid' campaign. This advertising concept has been unsuccessful.

You have one hour (60 minutes), to come up with *three* creative advertisements (20 minutes each). Please spend the *first five minutes* (of the 20 minutes allotted to each advertisement) generating and recording as many different creative ideas as possible on the page entitled 'Creative Ideas Page'. Then select the best creative idea as the chosen concept you wish to develop during the *remaining fifteen minute* period.

When generating your ideas please use the key word provided on each cover page to help you. As a non-advertising example, if I were asked to 'develop creative uses for a brick,' and the key word was 'WATER', the ideas that come to mind might be:

5. Use it to splash a person who was walking past a lake
6. Use it on a wet path to keep my feet dry
7. Use it to dam up a very small stream
8. Use it to plug a hole in a dam

First, I would list all of the ideas either pictorially or as a written list. Then I might select the idea, 'Use it on a wet path to keep my feet dry' as my chosen creative idea to develop in more detail. The number of ideas that you generate, and the amount and type of detail you provide on each of your three chosen concepts is up to you. There are no correct or incorrect responses.

Appendix 10: Agency Personnel Self Assessment Rating and Demographics Form

1. Using your own definition of creativity how would you rate your three advertisements for their level of *CREATIVITY* using the following 1-7 rating scale? A rating of One (1) would indicate you thought the advertisement was extremely uncreative with a Seven (7) being extremely creative. (Please Circle)

	Extremely Uncreative					Extremely Creative	
Your first advertisement:	1	2	3	4	5	6	7
Your second advertisement:	1	2	3	4	5	6	7
Your third advertisement:	1	2	3	4	5	6	7

2. How would you rate your three advertisements on their likelihood of gaining the *ATTENTION* of the target market audience?

	Extremely Unlikely					Extremely Likely	
Your first advertisement:	1	2	3	4	5	6	7
Your second advertisement:	1	2	3	4	5	6	7
Your third advertisement:	1	2	3	4	5	6	7

3. How would you rate your three advertisements on their likelihood of *PERSUADING* the target market of the benefit(s) of your product?

	Extremely Unpersuasive					Extremely Persuasive	
Your first advertisement:	1	2	3	4	5	6	7
Your second advertisement:	1	2	3	4	5	6	7
Your third advertisement:	1	2	3	4	5	6	7

4. Using your own definition of effectiveness how would you rate your three advertisements in terms of their overall *EFFECTIVENESS*?

	Extremely Ineffective					Extremely Effective	
Your first advertisement:	1	2	3	4	5	6	7
Your second advertisement:	1	2	3	4	5	6	7
Your third advertisement:	1	2	3	4	5	6	7

5. For the three words in the table below, please rate how associated they are with 'household insecticide spray'. A rating of 1 would be a very weak association and a rating of 7 a very strong association. For example the terms *DAY* and *NIGHT* are strongly associated, whereas *DAY* and *SCISSORS* are weakly associated.

	Weak Association					Strong Association	
Frog	1	2	3	4	5	6	7
Sleep	1	2	3	4	5	6	7
Winter	1	2	3	4	5	6	7

6. Please use the scale below to tell us to what extent you agree with the statements in the table below. Please write the appropriate numbers in the boxes to the right of each statement for each of your three advertisements

If your answer is...	Strongly disagree	Disagree	Somewhat disagree	Neither	Somewhat agree	Agree	Strongly agree
Put this number in the box...	-3	-2	-1	0	+1	+2	+3

Compared to other advertisements for the product category you have seen, the three advertisements you developed were...	First Advert	Second Advert	Third Advert
...on strategy			
...original			
...a good fit with the strategy			
...imaginative			
...unexpected			
...novel			
...an appropriate strategy for the client			
...different			
...built on good strategy			

7. Compared to other employees in your area (e.g., creative, account, media, etc.) at my agency, I...	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly Agree
...am a good problem solver.	-3	-2	-1	0	+1	+2	+3
...come up with ideas that are all different from one another.	-3	-2	-1	0	+1	+2	+3
...follow the right steps to solve advertising problems.	-3	-2	-1	0	+1	+2	+3
...develop original ideas no one else thinks of.	-3	-2	-1	0	+1	+2	+3
...work my way through advertising problems.	-3	-2	-1	0	+1	+2	+3
...do a great job refining ideas.	-3	-2	-1	0	+1	+2	+3
...know how to solve advertising problems.	-3	-2	-1	0	+1	+2	+3
...develop many alternative ideas, not just one.	-3	-2	-1	0	+1	+2	+3
...think up a large number of ideas.	-3	-2	-1	0	+1	+2	+3
...am a good divergent thinker.	-3	-2	-1	0	+1	+2	+3

8. In the creative work I just did for the household spray insecticide, I showed that I understood...	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly Agree
...the target consumer.	-3	-2	-1	0	+1	+2	+3
...the brand.	-3	-2	-1	0	+1	+2	+3
...the product category.	-3	-2	-1	0	+1	+2	+3
...the strategy to be used for the client.	-3	-2	-1	0	+1	+2	+3
...marketing strategy in general.	-3	-2	-1	0	+1	+2	+3
...the media used.	-3	-2	-1	0	+1	+2	+3

How many years have you been in the advertising business? _____ years.

What is your current job title? _____

What is your rank? (Please check only one)

- CEO/CCO Senior VP Manager Other: _____
- Executive VP VP Executive
- Managing Dir. Director Specialist

Which area of the advertising business best describes your current position? (Please check one only)

- Creative Strategic/account planning Production/operations
- Media/research Account management Other: _____

What clients do you have personal experience with on **3 or more** campaigns? (Please check all that apply)

- Consumer package goods Financial services or banking
- Automobiles/vehicles Other services
- Consumer durables (excluding autos) Business-to-business
- Retail Telecommunications/technology
- Restaurant/food service Other: _____

What media do you have personal experience with on **3 or more** campaigns? (Please check all that apply)

- TV Magazines Transit
- Radio Direct response Outdoor
- Newspapers Electronic/interactive Other: _____

Are you: Male Female Single Married

Your age is:

- 18-24 25-34 35-44 45-54 55-64 65+

Your highest level of education is:

- High school One year of university Two years of university
- Creative design/art program 3 or 4 year university degree Graduate degree

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY!

Appendix 11: Student Self Assessment Rating and Demographics

1. Using your own definition of creativity how would you rate your three advertisements for their level of *CREATIVITY* using the following 1-7 rating scale? A rating of One (1) would indicate you thought the advertisement was extremely uncreative with a Seven (7) being extremely creative. (Please Circle)

	Extremely Uncreative					Extremely Creative	
Your first advertisement:	1	2	3	4	5	6	7
Your second advertisement:	1	2	3	4	5	6	7
Your third advertisement:	1	2	3	4	5	6	7

2. How would you rate your three advertisements on their likelihood of gaining the *ATTENTION* of the target market audience?

	Extremely Unlikely					Extremely Likely	
Your first advertisement:	1	2	3	4	5	6	7
Your second advertisement:	1	2	3	4	5	6	7
Your third advertisement:	1	2	3	4	5	6	7

3. How would you rate your three advertisements on their likelihood of *PERSUADING* the target market of the benefit(s) of your product?

	Extremely Unpersuasive					Extremely Persuasive	
Your first advertisement:	1	2	3	4	5	6	7
Your second advertisement:	1	2	3	4	5	6	7
Your third advertisement:	1	2	3	4	5	6	7

4. Using your own definition of effectiveness how would you rate your three advertisements in terms of their overall *EFFECTIVENESS*?

	Extremely Ineffective					Extremely Effective	
Your first advertisement:	1	2	3	4	5	6	7
Your second advertisement:	1	2	3	4	5	6	7
Your third advertisement:	1	2	3	4	5	6	7

5. Please use the scale below to tell us to what extent you agree with the statements in the table below. Please write the appropriate numbers in the boxes to the right of each statement for each of your three advertisements

If your answer is...	Strongly disagree	Disagree	Somewhat disagree	Neither	Somewhat agree	Agree	Strongly agree
Put this number in the box...	-3	-2	-1	0	+1	+2	+3

Compared to other advertisements for the product category you have seen, the three advertisements you developed were...	First Advert	Second Advert	Third Advert
...on strategy			
...original			
...a good fit with the strategy			
...imaginative			
...unexpected			
...novel			
...an appropriate strategy for the client			
...different			
...built on good strategy			

Now, please tell us about yourself. Your responses will be used for classification purposes only.

6. Are you currently, or have you in the past, taken any advertising courses or worked in an advertising agency?

- No
- Yes, please indicate the course or job _____

7. Are you: Male Female

8. Is English your first language? No Yes

9. Your age is:

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY!

Note: If the associated words were used then this question was added to the research instrument. The words used were varied in this question to correspond with the different words used in the divergent thinking task.

5. For the three words in the table below, please rate how associated they are with 'household insecticide spray'. A rating of 1 would be a very weak association and a rating of 7 a very strong association. For example the terms DAY and NIGHT are strongly associated, whereas DAY and SCISSORS are weakly associated.

	Weak Association					Strong Association	
	1	2	3	4	5	6	7
Frog							
Sleep							
Winter							

Appendix 12: Coder's Guide

Creative: Both appropriate for the target audience (21-35 male and female, upper middle class) and original. The combination of something that is different and new and correct – fits together well

Attention: The ability of the ad to grab your attention – look more at the concept than the execution. Is it something you would look at or would you change the channel on the remote.

Novel: Is the idea one of a kind?

Persuasion: Does the concept say the right things. Would it make you change your mind, persuade you of the benefits of the brand?

Effective: Does the concept or message move you toward the possibility of purchase?

Appropriate for the Target Market: Is it the correct message for upper-middle class young adults 21-35 males and females. Would they find it to be an appropriate message?

Elaborate: Is there sufficient detail and considerable thought given to the ad concept? Does it combine different elements to make a complete ad concept?

Competitive Advantage: Is the competitive advantage portrayed well in the concept – breaks down in 30 minutes leaving no chemical residue?

Fit with Strategy: Does the concept work with the overall strategy of increasing awareness and sales of the products competitive advantage amongst the target market?

Imaginative: Does the concept do something that shows imagination and abstract thought?

Polished: Does the chosen concept show well detailed ideas that are finished well?

Unexpected: Is the concept different from what you would have expected from an ad for fly spray?

Execution Skill: Does the chosen ad show a strong level of final execution elements and techniques?

Original: Is the concept something that is entirely new, or is it a copy of something you have seen before? (may or may not be for the same product category).

Appropriate strategy: Is the concept appropriate given the need to communicate the competitive advantage in a way the target audience will respond to?

Different: Is the concept unlike other ad concepts for the product category?

Complete: Is the chosen concept developed into a complete TVC?

Built on good strategy: Is the chosen concept an idea that shows consideration to the strategy?

Appendix 13: Coding Form

Stage One

1. Please rate the three advertisements based upon the extent to which you agree with the statements in the table below. Please write the appropriate numbers in the boxes to the right of each statement for each of the three advertisements

If your answer is...	Strongly disagree	Disagree	Somewhat disagree	Neither	Somewhat agree	Agree	Strongly agree
Put this number in the box...	-3	-2	-1	0	+1	+2	+3

Compared to other advertisements for the product category you have seen, the three advertisements were...	First Advert	Second Advert	Third Advert
...creative			
...had a high likelihood of gaining the attention of the target market audience			
...novel			
...had a high likelihood of persuading the target market audience of its benefits			
...effective			
...appropriate for the target market			
...had highly elaborated ideas			
...“on strategy – conveyed the competitive advantage benefits well”			
...a good fit with the strategy			
...imaginative			
...were well polished			
...unexpected			
...showed strong ad execution skills			
...original			
...an appropriate strategy for the client			
...different			
...a complete coherent advertisement			
...built on good strategy			

1. Rate the degree of difference between the three chosen adverts developed on the following scale. A rating of One (1) would indicate you thought the advertisements was extremely similar to the other ad with a Seven (7) being extremely different.

	Extremely Similar			Extremely Different			
	1	2	3	4	5	6	7
1 st and 2 nd advertisement	1	2	3	4	5	6	7
2 nd and 3 rd advertisement	1	2	3	4	5	6	7
1 st and 3 rd advertisement	1	2	3	4	5	6	7

Rate the extent to which you thought there was a deliberate theme throughout the three advertisements

Weak Theme			Please Circle				Strong Theme	
1	2	3	4	5	6	7		

List any references that were made to the target market – i.e. US stereotypes (flags, accents, French stereotypes (Eiffel tower, croissants), or demographic references, young adults, etc

Idea 1: Ad 1 _____ S ___ D ___

Idea 2: Ad 2 _____ S ___ D ___

Idea 3: Ad 3 _____ S ___ D ___

Rate the extent to which you thought any reference to the target market was peripheral or central in the three advertisements

	Peripheral			Please Circle				Central	
	1	2	3	4	5	6	7		
First advertisement	1	2	3	4	5	6	7		
Second advertisement	1	2	3	4	5	6	7		
Third advertisement	1	2	3	4	5	6	7		

List any references that were made to the Fester Campaign (carton bugs)/raid fly spray/spray cans

Idea 1: Ad 1 _____

Idea 2: Ad 2 _____

Idea 3: Ad 3 _____

Rate the extent to which you thought any reference to the Fester Campaign was peripheral or central in the three advertisements

	Peripheral			Please Circle				Central	
	1	2	3	4	5	6	7		
First advertisement	1	2	3	4	5	6	7		
Second advertisement	1	2	3	4	5	6	7		
Third advertisement	1	2	3	4	5	6	7		

List any references that were made to the product's competitive advantage (chemical breakdown in 30 minutes)

Idea 1: Ad 1 _____

Idea 2: Ad 2 _____

Idea 3: Ad 3 _____

Rate the extent to which you thought any reference to the product's competitive advantage was peripheral or central in the three advertisements

	Peripheral					Central	
	1	2	3	4	5	6	7
First advertisement	1	2	3	4	5	6	7
Second advertisement	1	2	3	4	5	6	7
Third advertisement	1	2	3	4	5	6	7

Stage Two: Creative Ideas Page

How many ideas were developed by the respondent for each advertisement?

Advert 1 ____ Advert 2 ____ Advert 3 ____

What were the number of words/pictures on each of the three creative ideas pages?

Words Advert 1 ____ Advert 2 ____ Advert 3 ____

Pictures Advert 1 ____ Advert 2 ____ Advert 3 ____

Select, and record, the most original advert from each list of ideas listed on each of the creative ideas pages, and indicate if it was/was not the chosen ad idea developed?

Idea 1: Ad 1 _____ Y__N__

Idea 2: Ad 2 _____ Y__N__

Idea 3: Ad 3 _____ Y__N__

Rate the extent to which you thought there were strong differences among the ideas on the creative ideas pages

	Extremely Similar		Please Circle					Extremely Different	
Degree of difference – Ad 1	1	2	3	4	5	6	7		
Degree of difference – Ad 2	1	2	3	4	5	6	7		
Degree of difference – Ad 3	1	2	3	4	5	6	7		

Appendix 14: Data Output from the Experiment

Information on coders

The FACTOR Procedure

Initial Factor Method: Principal Components

Prior Communalities Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 3 Average = 1

	Eigenvalue	Difference	Proportion	Cumulative
1	1.77753904	1.12630451	0.5925	0.5925
2	0.65123453	0.08000809	0.2171	0.8096
3	0.57122644		0.1904	1.0000

1 factor will be retained by the MINEIGEN criterion.

Factor Pattern

Factor1

COL1	0.74290
COL2	0.77753
COL3	0.78809

Variance Explained by Each Factor

Factor1

1.7775390

Final Communalities Estimates: Total = 1.777539

	COL1	COL2	COL3
	0.55190348	0.60455524	0.62108032

dt dsk ps factor analysis

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The FACTOR Procedure

Initial Factor Method: Principal Components

Prior Communalities Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 12 Average = 1

	Eigenvalue	Difference	Proportion	Cumulative
1	4.27824324	2.10888630	0.3565	0.3565
2	2.16935694	0.73320763	0.1808	0.5373
3	1.43614931	0.67242332	0.1197	0.6570
4	0.76372599	0.13462455	0.0636	0.7206
5	0.62910144	0.03131831	0.0524	0.7730
6	0.59778313	0.05890619	0.0498	0.8229
7	0.53887694	0.07825617	0.0449	0.8678
8	0.46062077	0.03818259	0.0384	0.9062
9	0.42243818	0.05778459	0.0352	0.9414
10	0.36465359	0.17430276	0.0304	0.9717
11	0.19035082	0.04165116	0.0159	0.9876
12	0.14869966		0.0124	1.0000

3 factors will be retained by the MINEIGEN criterion.

Inter-Factor Correlations

	Factor1	Factor2	Factor3
Factor1	1.00000	0.14650	0.27938
Factor2	0.14650	1.00000	0.32746
Factor3	0.27938	0.32746	1.00000

Rotated Factor Pattern (Standardized Regression Coefficients)

	Factor1	Factor2	Factor3
ProbSolv	-0.02477	0.07408	0.73527
Rsteps	-0.01597	0.09222	0.71696
DevOrig	0.68905	-0.15211	0.21712
WAdvPr	0.02691	0.00192	0.76982
SolAPr	0.10797	-0.03770	0.77369
DevMAI	0.83904	0.24244	-0.06682
LarNold	0.88583	0.12347	-0.09142
DivThink	0.82246	-0.13403	0.12496
TargCons	-0.17326	0.68897	0.20954
ProdCat	0.23452	0.67049	-0.05440
StratCli	-0.06021	0.87719	0.02043
MktSGen	0.05741	0.83640	0.06128

The FACTOR Procedure

Rotation Method: Oblimin (tau = 0)

Final Communalities Estimates: Total = 7.883749

ProbSolv	Rsteps	DevOrig	WAdvPr	SolAPr	DevMAI
0.57167489	0.55925948	0.57632583	0.60590940	0.63806349	0.78489892
LarNold	DivThink	TargCons	ProdCat	StratCli	MktSGen
0.78769540	0.72417380	0.58788891	0.52256491	0.76907643	0.75621804

Self report factor analysis

The FACTOR Procedure

Initial Factor Method: Principal Components

Prior Communalities Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 8 Average = 1

	Eigenvalue	Difference	Proportion	Cumulative
1	4.04658911	2.21862277	0.5058	0.5058
2	1.82796634	1.34117457	0.2285	0.7343
3	0.48679177	0.05112439	0.0608	0.7952
4	0.43566738	0.07979881	0.0545	0.8496
5	0.35586857	0.03052172	0.0445	0.8941
6	0.32534685	0.05367346	0.0407	0.9348
7	0.27167339	0.02157680	0.0340	0.9687
8	0.25009659		0.0313	1.0000

2 factors will be retained by the NFACTOR criterion.

Inter-Factor Correlations

	Factor1	Factor2
Factor1	1.00000	0.28619
Factor2	0.28619	1.00000

Rotated Factor Pattern (Standardized Regression Coefficients)

	Factor1	Factor2
Orig	0.82263	0.01882
Imag	0.85235	0.05184
Unex	0.89395	-0.07370
Novel	0.81385	0.06688
Diff	0.89447	-0.04640
Sfit	-0.04774	0.88340
ASCI	-0.01213	0.85695
BGSt	0.07363	0.81484

Variance Explained by Each Factor Ignoring Other Factors

Factor1	Factor2
3.8604148	2.5027291

Final Communalities Estimates: Total = 5.874555

Orig	Imag	Unex	Novel	Diff	Sfit	ASCI	BGSt
------	------	------	-------	------	------	------	------

0.68593914 0.75447041 0.76686422 0.69797360 0.77847865 0.75853524 0.72856546 0.70372871
Judge' s evaluation

The FACTOR Procedure
 Initial Factor Method: Principal Components
 Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 8 Average = 1

	Ei genva lue	Di fference	Proporti on	Cumul ati ve
1	5.13410320	3.13140858	0.6418	0.6418
2	2.00269461	1.77412866	0.2503	0.8921
3	0.22856595	0.04024789	0.0286	0.9207
4	0.18831806	0.06126475	0.0235	0.9442
5	0.12705331	0.00360508	0.0159	0.9601
6	0.12344823	0.01714395	0.0154	0.9755
7	0.10630428	0.01679192	0.0133	0.9888
8	0.08951236		0.0112	1.0000

2 factors will be retained by the NFACTOR criterion.
 Inter-Factor Correlations

	Factor1	Factor2
Factor1	1.00000	0.37559
Factor2	0.37559	1.00000

Rotated Factor Pattern (Standardized Regression Coefficients)

	Factor1	Factor2
zOri g	0.91097	0.08301
zImag	0.82912	0.16430
zUnexp	0.99038	-0.14643
zno vel	0.90326	0.06587
zdi ff	0.97117	-0.06836
zFi tStr	-0.02691	0.96831
zApprSt	0.00786	0.95866
zBui lGS	0.04771	0.94371

Variance Explained by Each Factor Ignoring Other Factors

Factor1	Factor2
4.7218157	3.4775118

Final Communality Estimates: Total = 7.136798

zOri g	zImag	zUnexp	zno vel	zdi ff	zFi tStr	zApprSt	zBui lGS
0.89357139	0.81675976	0.89335514	0.86490667	0.89797113	0.91878223	0.92475570	0.92669579

Correlati ons among eval uati ons

6 Vari ables: ori gi nal approp zori gi nal zapprop creati ve zcreati v

Simple Stati stics

Vari able	N	Mean	Std Dev	Sum	Mi ni mum	Maxi mum
ori gi nal	629	0	1.00000	0	-2.98926	1.72159
approp	629	0	1.00000	0	-3.24166	1.79028
zori gi nal	633	0	1.00000	0	-2.67944	2.00503
zapprop	633	0	1.00000	0	-2.63114	2.10443
creati ve	629	0.28574	1.83689	179.72925	-5.83902	6.38778
zcreati v	633	0.37499	1.73592	237.37107	-4.90196	6.78685

Pearson Correlation Coefficients
 Prob > |r| under H0: Rho=0
 Number of Observations

	original	approp	zoriginal	zapprop	creative	zcreativ
original	1.00000 629	0.28619 <.0001 629	0.33755 <.0001 623	0.00914 0.8199 623	0.61359 <.0001 629	0.19411 <.0001 623
approp	0.28619 <.0001 629	1.00000 629	0.02805 0.4847 623	0.17258 <.0001 623	0.62878 <.0001 629	0.09571 0.0169 623
zoriginal	0.33755 <.0001 623	0.02805 0.4847 623	1.00000 633	0.37559 <.0001 633	0.14857 0.0002 623	0.60360 <.0001 633
zapprop	0.00914 0.8199 623	0.17258 <.0001 623	0.37559 <.0001 633	1.00000 633	0.05649 0.1591 623	0.69781 <.0001 633
creative	0.61359 <.0001 629	0.62878 <.0001 629	0.14857 0.0002 623	0.05649 0.1591 623	1.00000 629	0.13418 0.0008 623
zcreativ	0.19411 <.0001	0.09571 0.0169	0.60360 <.0001	0.69781 <.0001	0.13418 0.0008	1.00000

GLM/Regression results for original and zoriginal

The GLM Procedure

Class Level Information

Class	Levels	Values
tech	2	0 1
past_camp	2	0 1
country	2	d f
area	4	a c f s

Number of observations 639

Dependent Variables With Equivalent Missing Value Patterns

Pattern	Obs	Dependent Variables
1	629	original
2	630	zoriginal

NOTE: Variables in each group are consistent with respect to the presence or absence of missing values.

The GLM Procedure

Dependent Variable: original

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	21.9616940	1.9965176	2.03	0.0234
Error	617	606.0383060	0.9822339		
Corrected Total	628	628.0000000			

R-Square	Coeff Var	Root MSE	original Mean
0.034971	-1.6943E17	0.991077	-0.000000

Source	DF	Type III SS	Mean Square	F Value	Pr > F
tech	1	0.20454092	0.20454092	0.21	0.6483
past_camp	1	1.85203960	1.85203960	1.89	0.1702
country	1	4.76274311	4.76274311	4.85	0.0280
area	3	10.09383281	3.36461094	3.43	0.0169
tech*past_camp	1	1.57009437	1.57009437	1.60	0.2066
tech*area	3	2.22736897	0.74245632	0.76	0.5192
order	1	2.69452503	2.69452503	2.74	0.0982

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	-.0112466042	0.16939294	-0.07	0.9471
tech 0	-.0713047798	0.19207333	-0.37	0.7106
tech 1	0.0000000000	.	.	.
past_camp 0	0.0085282017	0.10999626	0.08	0.9382
past_camp 1	0.0000000000	.	.	.
country d	-.1755205070	0.07970889	-2.20	0.0280
country f	0.0000000000	.	.	.
area a	-.1888239779	0.15306869	-1.23	0.2178
area c	0.0395947501	0.16391233	0.24	0.8092
area f	-.1281318654	0.16060008	-0.80	0.4253
area s	0.0000000000	.	.	.
tech*past_camp 0 0	0.2016722196	0.15951101	1.26	0.2066
tech*past_camp 0 1	0.0000000000	.	.	.
tech*past_camp 1 0	0.0000000000	.	.	.
tech*past_camp 1 1	0.0000000000	.	.	.
tech*area 0 a	0.0734634774	0.22603081	0.33	0.7453
tech*area 0 c	0.1357767064	0.23773544	0.57	0.5681
tech*area 0 f	-.1812695837	0.23473102	-0.77	0.4403
tech*area 0 s	0.0000000000	.	.	.
tech*area 1 a	0.0000000000	.	.	.
tech*area 1 c	0.0000000000	.	.	.
tech*area 1 f	0.0000000000	.	.	.
tech*area 1 s	0.0000000000	.	.	.
order	0.0804118295	0.04854967	1.66	0.0982

The GLM Procedure
Least Squares Means

tech	past_camp	original LSMEAN
0	0	0.13772562
0	1	-0.07247481
1	0	0.00036553
1	1	-0.00816268

tech	area	original LSMEAN
0	a	-0.02038747
0	c	0.27034449
0	f	-0.21442842
0	s	0.09497303
1	a	-0.12338228
1	c	0.10503645
1	f	-0.06269017
1	s	0.06544170

The GLM Procedure

Dependent Variable: zori gi nal

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	171.2876430	15.5716039	20.94	<.0001
Error	618	459.5672507	0.7436363		
Corrected Total	629	630.8548937			

R-Square Coeff Var Root MSE zori gi nal Mean
 0.271517 112675.6 0.862344 0.000765

Source	DF	Type III SS	Mean Square	F Value	Pr > F
tech	1	0.1952072	0.1952072	0.26	0.6086
past_camp	1	7.3657798	7.3657798	9.91	0.0017
country	1	0.0543323	0.0543323	0.07	0.7870
area	3	134.4595182	44.8198394	60.27	<.0001
tech*past_camp	1	4.5027162	4.5027162	6.05	0.0141
tech*area	3	15.0817166	5.0272389	6.76	0.0002
order	1	9.3364303	9.3364303	12.56	0.0004

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	-0.093718650 B	0.14674149	-0.64	0.5233
tech 0	-0.421039017 B	0.16706299	-2.52	0.0120
tech 1	0.000000000 B	.	.	.
past_camp 0	0.047532548 B	0.09620734	0.49	0.6214
past_camp 1	0.000000000 B	.	.	.
country d	-0.018733320 B	0.06930520	-0.27	0.7870
country f	0.000000000 B	.	.	.
area a	0.075038122 B	0.13294326	0.56	0.5727
area c	0.242167575 B	0.14422617	1.68	0.0936
area f	-1.083957180 B	0.14031512	-7.73	<.0001
area s	0.000000000 B	.	.	.
tech*past_camp 0 0	0.340641634 B	0.13843335	2.46	0.0141
tech*past_camp 0 1	0.000000000 B	.	.	.
tech*past_camp 1 0	0.000000000 B	.	.	.
tech*past_camp 1 1	0.000000000 B	.	.	.
tech*area 0 a	-0.162948406 B	0.19650097	-0.83	0.4073
tech*area 0 c	0.477996701 B	0.20764836	2.30	0.0217
tech*area 0 f	0.545131244 B	0.20340910	2.68	0.0076
tech*area 0 s	0.000000000 B	.	.	.
tech*area 1 a	0.000000000 B	.	.	.
tech*area 1 c	0.000000000 B	.	.	.
tech*area 1 f	0.000000000 B	.	.	.
tech*area 1 s	0.000000000 B	.	.	.
order	0.149095928	0.04207805	3.54	0.0004

The GLM Procedure

Least Squares Means

		zori gi nal LSMEAN
tech	past_camp	
0	0	0.18559873
0	1	-0.20257546
1	0	0.05095122
1	1	0.00341868

		zori gi nal LSMEAN
tech	area	
0	a	-0.11975566
0	c	0.68831890
0	f	-0.57067131
0	s	-0.03184538
1	a	0.29391094
1	c	0.46104040
1	f	-0.86508436
1	s	0.21887282

GLM/Regression results for approp and zapprop

The GLM Procedure

Dependent Variable: approp

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	49.0454220	3.7727248	4.01	<.0001
Error	615	578.9545780	0.9413896		
Corrected Total	628	628.0000000			

R-Square Coeff Var Root MSE approp Mean
 0.078098 -3.4835E17 0.970252 -0.000000

Source	DF	Type III SS	Mean Square	F Value	Pr > F
tech	1	19.10636248	19.10636248	20.30	<.0001
past_camp	1	0.02002865	0.02002865	0.02	0.8841
country	1	7.20062557	7.20062557	7.65	0.0059
area	3	7.61713827	2.53904609	2.70	0.0451
past_camp*area	3	12.30729186	4.10243062	4.36	0.0048
country*area	3	2.17257071	0.72419024	0.77	0.5115
order	1	0.35091270	0.35091270	0.37	0.5417

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	-.1596597977	0.18663380	-0.86	0.3926
tech	0.3520485855	0.07814448	4.51	<.0001
tech	0.0000000000	.	.	.
past_camp	-.0345143912	0.16931488	-0.20	0.8385
past_camp	0.0000000000	.	.	.
country	-.2873778803	0.16981332	-1.69	0.0911
country	0.0000000000	.	.	.
area	-.1247496571	0.19690443	-0.63	0.5266
area	0.2528499193	0.20684347	1.22	0.2220
area	0.0482624702	0.19965136	0.24	0.8091
area	0.0000000000	.	.	.
past_camp*area	0.4598743536	0.22077124	2.08	0.0377
past_camp*area	-.1288244196	0.23271819	-0.55	0.5801
past_camp*area	-.2388947859	0.23152689	-1.03	0.3026
past_camp*area	0.0000000000	.	.	.
past_camp*area	0.0000000000	.	.	.
past_camp*area	0.0000000000	.	.	.
past_camp*area	0.0000000000	.	.	.
past_camp*area	0.0000000000	.	.	.
past_camp*area	0.0000000000	.	.	.
past_camp*area	0.0000000000	.	.	.
country*area	0.2471991418	0.22107791	1.12	0.2639
country*area	-.0522737661	0.23267737	-0.22	0.8223
country*area	0.0845082807	0.23150321	0.37	0.7152
country*area	0.0000000000	.	.	.
country*area	0.0000000000	.	.	.
country*area	0.0000000000	.	.	.
country*area	0.0000000000	.	.	.
country*area	0.0000000000	.	.	.
country*area	0.0000000000	.	.	.
order	0.0290174742	0.04752748	0.61	0.5417

The GLM Procedure
 Least Squares Means

past_camp	area	approp LSMEAN
0	a	0.35468972
0	c	-0.00614593
0	f	-0.25241273
0	s	-0.10403455
1	a	-0.07067025
1	c	0.15719288
1	f	0.02099645
1	s	-0.06952016

country	area	approp LSMEAN
d	a	0.12192037
d	c	-0.09430235
d	f	-0.21714294
d	s	-0.23046630
f	a	0.16209910
f	c	0.24534929
f	f	-0.01427334
f	s	0.05691158

The GLM Procedure

Dependent Variable: zappro

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	223.5596165	17.1968936	26.09	<.0001
Error	616	405.9585235	0.6590236		
Corrected Total	629	629.5181400			

R-Square Coeff Var Root MSE zappro Mean
 0.355128 19664.36 0.811803 0.004128

Source	DF	Type III SS	Mean Square	F Value	Pr > F
tech	1	8.3631011	8.3631011	12.69	0.0004
past_camp	1	0.0003909	0.0003909	0.00	0.9806
country	1	0.6206917	0.6206917	0.94	0.3322
area	3	176.0501436	58.6833812	89.05	<.0001
past_camp*area	3	9.4871736	3.1623912	4.80	0.0026
country*area	3	19.5787093	6.5262364	9.90	<.0001
order	1	2.7049237	2.7049237	4.10	0.0432

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	-.1653136156	0.15581769	-1.06	0.2891
tech 0	0.2323727224	0.06523069	3.56	0.0004
tech 1	0.0000000000	.	.	.
past_camp 0	-.1948264496	0.14166435	-1.38	0.1695
past_camp 1	0.0000000000	.	.	.
country d	0.2200983597	0.14208150	1.55	0.1219
country f	0.0000000000	.	.	.
area a	-.0077997608	0.16428606	-0.05	0.9621
area c	0.2903547920	0.17330135	1.68	0.0944
area f	-.8380645563	0.16606744	-5.05	<.0001
area s	0.0000000000	.	.	.
past_camp*area 0 a	0.4573568915	0.18454339	2.48	0.0135
past_camp*area 0 c	-.0965669283	0.19555948	-0.49	0.6216
past_camp*area 0 f	0.4249396852	0.19355247	2.20	0.0285
past_camp*area 0 s	0.0000000000	.	.	.
past_camp*area 1 a	0.0000000000	.	.	.
past_camp*area 1 c	0.0000000000	.	.	.
past_camp*area 1 f	0.0000000000	.	.	.
past_camp*area 1 s	0.0000000000	.	.	.
country*area d a	0.1838639093	0.18478002	1.00	0.3201
country*area d c	-.0668339941	0.19545797	-0.34	0.7325
country*area d f	-.7415308975	0.19367147	-3.83	0.0001
country*area d s	0.0000000000	.	.	.
country*area f a	0.0000000000	.	.	.
country*area f c	0.0000000000	.	.	.
country*area f f	0.0000000000	.	.	.
country*area f s	0.0000000000	.	.	.
order	0.0802514457	0.03961191	2.03	0.0432

The GLM Procedure
 Least Squares Means

past_camp	area	zappro LSMEAN
0	a	0.56808745
0	c	0.18696923
0	f	-0.75729195
0	s	0.02659837
1	a	0.30555701
1	c	0.47836261
1	f	-0.98740519
1	s	0.22142482

country	area	zappro LSMEAN
d	a	0.63880337
d	c	0.40929811
d	f	-1.13306484
d	s	0.23406077
f	a	0.23484110
f	c	0.25603374
f	f	-0.61163230
f	s	0.01396241

GLM/Regression results for creative and zcreative

The GLM Procedure

Dependent Variable: creative

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	21	215.649604	10.269029	3.34	<.0001
Error	595	1831.476973	3.078113		
Corrected Total	616	2047.126576			

R-Square Coeff Var Root MSE creative Mean
 0.105343 691.0937 1.754455 0.253866

Source	DF	Type III SS	Mean Square	F Value	Pr > F
tech	1	26.40539543	26.40539543	8.58	0.0035
past_camp	1	10.12240530	10.12240530	3.29	0.0703
country	1	59.77217550	59.77217550	19.42	<.0001
area	3	14.68598388	4.89532796	1.59	0.1906
tech*area	3	21.06602919	7.02200973	2.28	0.0782
past_camp*area	3	20.11548611	6.70516204	2.18	0.0895
country*area	3	15.03939341	5.01313114	1.63	0.1816
tech*past_camp*area	4	14.11022664	3.52755666	1.15	0.3338
zNoPic	1	17.93047530	17.93047530	5.83	0.0161
order	1	3.87000904	3.87000904	1.26	0.2626

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	-0.269721699 B	0.40301009	-0.67	0.5036
tech 0	0.548865636 B	0.44657887	1.23	0.2195
tech 1	0.000000000 B	.	.	.
past_camp 0	0.613117955 B	0.41852826	1.46	0.1435
past_camp 1	0.000000000 B	.	.	.
country d	-0.670357891 B	0.31181266	-2.15	0.0320
country f	0.000000000 B	.	.	.
area a	-0.226745878 B	0.45196376	-0.50	0.6161
area c	1.184280535 B	0.48726396	2.43	0.0154
area f	0.539149478 B	0.47586009	1.13	0.2577
area s	0.000000000 B	.	.	.
tech*area 0 a	0.357037747 B	0.57208367	0.62	0.5328
tech*area 0 c	-0.793407341 B	0.59963295	-1.32	0.1863
tech*area 0 f	-0.787878525 B	0.61253052	-1.29	0.1988
tech*area 0 s	0.000000000 B	.	.	.
tech*area 1 a	0.000000000 B	.	.	.
tech*area 1 c	0.000000000 B	.	.	.
tech*area 1 f	0.000000000 B	.	.	.
tech*area 1 s	0.000000000 B	.	.	.
past_camp*area 0 a	-0.071820236 B	0.54616819	-0.13	0.8954
past_camp*area 0 c	-1.067915368 B	0.59327578	-1.80	0.0724
past_camp*area 0 f	-0.981703297 B	0.57959375	-1.69	0.0908
past_camp*area 0 s	0.000000000 B	.	.	.
past_camp*area 1 a	0.000000000 B	.	.	.
past_camp*area 1 c	0.000000000 B	.	.	.
past_camp*area 1 f	0.000000000 B	.	.	.
past_camp*area 1 s	0.000000000 B	.	.	.
country*area d a	0.235790649 B	0.40443935	0.58	0.5601
country*area d c	-0.492239118 B	0.43322727	-1.14	0.2563
country*area d f	0.355701938 B	0.43789713	0.81	0.4169
country*area d s	0.000000000 B	.	.	.
country*area f a	0.000000000 B	.	.	.
country*area f c	0.000000000 B	.	.	.
country*area f f	0.000000000 B	.	.	.
country*area f s	0.000000000 B	.	.	.
tech*past_camp*area 0 0 a	-0.208699897 B	0.51678121	-0.40	0.6865
tech*past_camp*area 0 0 c	1.210301853 B	0.59486860	2.03	0.0423
tech*past_camp*area 0 0 f	0.163129969 B	0.58787576	0.28	0.7815
tech*past_camp*area 0 0 s	0.280014019 B	0.62087155	0.45	0.6522
tech*past_camp*area 0 1 a	0.000000000 B	.	.	.
tech*past_camp*area 0 1 c	0.000000000 B	.	.	.
tech*past_camp*area 0 1 f	0.000000000 B	.	.	.
tech*past_camp*area 0 1 s	0.000000000 B	.	.	.
tech*past_camp*area 1 0 a	0.000000000 B	.	.	.
tech*past_camp*area 1 0 c	0.000000000 B	.	.	.
tech*past_camp*area 1 0 f	0.000000000 B	.	.	.
tech*past_camp*area 1 0 s	0.000000000 B	.	.	.

```

tech*past_camp*area 1 1 a 0.00000000 B . . .
tech*past_camp*area 1 1 c 0.00000000 B . . .
tech*past_camp*area 1 1 f 0.00000000 B . . .
tech*past_camp*area 1 1 s 0.00000000 B . . .
zNoPic 0.163655272 0.06780728 2.41 0.0161
order 0.097505029 0.08695875 1.12 0.2626

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The GLM Procedure

Least Squares Means

tech	area	creative LSMEAN
0	a	0.60581485
0	c	0.71383460
0	f	0.01772298
0	s	0.63789473
1	a	-0.19573858
1	c	0.35322538
1	f	0.17517089
1	s	-0.05097791

past_camp	area	creative LSMEAN
0	a	0.42351202
0	c	0.60870675
0	f	-0.04706324
0	s	0.67002089
1	a	-0.01343575
1	c	0.45835323
1	f	0.23995711
1	s	-0.08310407

country	area	creative LSMEAN
d	a	-0.01224549
d	c	-0.04776851
d	f	-0.06088104
d	s	-0.04172053
f	a	0.42232175
f	c	1.11482850
f	f	0.25377491
f	s	0.62863736

tech	past_camp	area	creative LSMEAN
0	0	a	0.77211376
0	0	c	1.09158682
0	0	f	-0.08500470
0	0	s	1.08446072
0	1	a	0.43951594
0	1	c	0.33608238
0	1	f	0.12045067
0	1	s	0.19132875
1	0	a	0.07491028
1	0	c	0.12582667
1	0	f	-0.00912178
1	0	s	0.25558107
1	1	a	-0.46638744
1	1	c	0.58062409
1	1	f	0.35946356
1	1	s	-0.35753689

The GLM Procedure

Dependent Variable: zcreativ

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	21	446.055936	21.240759	8.89	<.0001
Error	602	1438.371747	2.389322		
Corrected Total	623	1884.427683			

R-Square Coeff Var Root MSE zcreativ Mean
 0.236706 401.2057 1.545743 0.385274

Source	DF	Type III SS	Mean Square	F Value	Pr > F
tech	1	5.6213725	5.6213725	2.35	0.1256
past_camp	1	1.8187679	1.8187679	0.76	0.3833
country	1	1.2761149	1.2761149	0.53	0.4652
area	3	318.9515612	106.3171871	44.50	<.0001
tech*area	3	22.0743212	7.3581071	3.08	0.0270
past_camp*area	3	22.2692278	7.4230759	3.11	0.0261
country*area	3	23.8169909	7.9389970	3.32	0.0195
tech*past_camp*area	4	31.6027456	7.9006864	3.31	0.0108
zNoPic	1	15.0387417	15.0387417	6.29	0.0124
order	1	21.5238295	21.5238295	9.01	0.0028

Parameter	Estimate	Standard Error	t Value	Pr > t
Intercept	-0.404652162	0.35448493	-1.14	0.2541
tech 0	0.541002811	0.39345026	1.38	0.1696
tech 1	0.000000000	.	.	.
past_camp 0	0.163177026	0.36873963	0.44	0.6583
past_camp 1	0.000000000	.	.	.
country d	0.302539571	0.27471627	1.10	0.2712
country f	0.000000000	.	.	.
area a	0.636176596	0.39659115	1.60	0.1092
area c	0.874401469	0.42920351	2.04	0.0421
area f	-0.392218245	0.41842113	-0.94	0.3489
area s	0.000000000	.	.	.
tech*area 0 a	-1.270021456	0.50324994	-2.52	0.0119
tech*area 0 c	0.784386187	0.52829585	1.48	0.1381
tech*area 0 f	-0.795883741	0.53281346	-1.49	0.1358
tech*area 0 s	0.000000000	.	.	.
tech*area 1 a	0.000000000	.	.	.
tech*area 1 c	0.000000000	.	.	.
tech*area 1 f	0.000000000	.	.	.
tech*area 1 s	0.000000000	.	.	.
past_camp*area 0 a	-0.449938246	0.48042051	-0.94	0.3494
past_camp*area 0 c	-0.335128712	0.52269835	-0.64	0.5217
past_camp*area 0 f	-0.205234087	0.50853199	-0.40	0.6867
past_camp*area 0 s	0.000000000	.	.	.
past_camp*area 1 a	0.000000000	.	.	.
past_camp*area 1 c	0.000000000	.	.	.
past_camp*area 1 f	0.000000000	.	.	.
past_camp*area 1 s	0.000000000	.	.	.
country*area d a	0.242416075	0.35600470	0.68	0.4962
country*area d c	-0.246582776	0.38131971	-0.65	0.5181
country*area d f	-0.830648876	0.38294287	-2.17	0.0305
country*area d s	0.000000000	.	.	.
country*area f a	0.000000000	.	.	.
country*area f c	0.000000000	.	.	.
country*area f f	0.000000000	.	.	.
country*area f s	0.000000000	.	.	.
tech*past_camp*area 0 0 a	1.273747761	0.45457702	2.80	0.0052
tech*past_camp*area 0 0 c	-1.016828547	0.52261607	-1.95	0.0522
tech*past_camp*area 0 0 f	0.190231252	0.50707030	0.38	0.7077
tech*past_camp*area 0 0 s	-0.659712253	0.54701096	-1.21	0.2283
tech*past_camp*area 0 1 a	0.000000000	.	.	.
tech*past_camp*area 0 1 c	0.000000000	.	.	.
tech*past_camp*area 0 1 f	0.000000000	.	.	.
tech*past_camp*area 0 1 s	0.000000000	.	.	.
tech*past_camp*area 1 0 a	0.000000000	.	.	.
tech*past_camp*area 1 0 c	0.000000000	.	.	.
tech*past_camp*area 1 0 f	0.000000000	.	.	.
tech*past_camp*area 1 0 s	0.000000000	.	.	.
tech*past_camp*area 1 1 a	0.000000000	.	.	.
tech*past_camp*area 1 1 c	0.000000000	.	.	.
tech*past_camp*area 1 1 f	0.000000000	.	.	.
tech*past_camp*area 1 1 s	0.000000000	.	.	.
zNoPic	-0.149745696	0.05968785	-2.51	0.0124
order	0.227918154	0.07593753	3.00	0.0028

The GLM Procedure

Least Squares Means

tech	area	zcreativ LSMEAN
0	a	0.67652447
0	c	1.63677417
0	f	-0.83367130
0	s	0.44740041
1	a	0.76866924
1	c	0.81979945
1	f	-0.67390600
1	s	0.23625372

past_camp	area	zcreativ LSMEAN
0	a	0.89765318
0	c	0.88810383
0	f	-0.72725937
0	s	0.25848752
1	a	0.54754052
1	c	1.56846979
1	f	-0.78031794
1	s	0.42516662

country	area	zcreativ LSMEAN
d	a	0.99507468
d	c	1.25626521
d	f	-1.01784331
d	s	0.49309685
f	a	0.45011903
f	c	1.20030841
f	f	-0.48973400
f	s	0.19055728

tech	past_camp	area	zcreativ LSMEAN
0	0	a	1.17001774
0	0	c	1.04238406
0	0	f	-0.75958421
0	0	s	0.19913280
0	1	a	0.18303120
0	1	c	2.23116429
0	1	f	-0.90775840
0	1	s	0.69566802
1	0	a	0.62528863
1	0	c	0.73382361
1	0	f	-0.69493453
1	0	s	0.31784224
1	1	a	0.91204985
1	1	c	0.90577529
1	1	f	-0.65287747
1	1	s	0.15466521

Effect Sizes - Hayes Omega Squ	tech	pastcar	country	area	tech*pa	tech_ar	pastc*ai	count*ai	tech*pc	order
One Way Effect Sizes										
Originality - Self Repor	F Value	1.89	4.85	3.43	1.60	2.74				2.74
		0.89	3.85	2.43	1.80	5.22				12.18
		642.89	645.85	644.43	643.80	647.22				643.74
	Hayes O2	0.001	0.006	0.004	0.003	0.008				0.019
Originality - Indep Judg	F Value	9.91		60.27	6.05	6.76				12.56
		8.91		59.27	15.15	17.28				80.92
		650.91		701.27	657.15	659.28				653.56
	Hayes O2	0.014		0.085	0.023	0.026				0.124
Appropriatness - Self	F Value	20.30		7.65	2.70		4.36			
		19.30		6.65	1.70		10.08			
		661.30		648.65	643.70		652.08			
	Hayes O2	0.029		0.010	0.003		0.015			
Appropriatness - Indep	F Value	12.69		89.05		4.80	9.90			4.10
		11.69		88.05		11.40	26.70			21.70
		653.69		730.05		653.40	668.70			645.10
	Hayes O2	0.018		0.121		0.017	0.040			0.034
Creativity - Self Report	F Value	8.58	3.29	19.42	1.59	2.28	2.18	1.63		
		7.58	2.29	18.42	0.59	3.84	3.54	1.89		
		649.58	644.29	660.42	642.59	645.84	645.54	643.89		
	Hayes O2	0.012	0.004	0.028	0.001	0.006	0.005	0.003		
Creativity - Indep Judg	F Value	2.35		44.5		3.08	3.11	3.32	3.31	9.01
		1.35		43.50		6.24	6.33	6.96	16.17	56.07
		643.35		685.50		648.24	648.33	648.96	658.17	650.01
	Hayes O2	0.002		0.063		0.010	0.010	0.011	0.025	0.086

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