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IDEA ASSESSMENT IN A BUSINESS SETTING

by
Marita Sørum and Sunniva Steinbakk

«This thesis was written as a part of the master program. Neither the institution, the advisor, nor the sensors are - through the approval of this thesis - responsible for neither the theories and methods used, nor results and conclusions drawn in this work.»

1 Preface

During our master's studies at the Norwegian School of Economics and Business Administration our main focus has been on human resource management. A series of courses have covered a broad range of subjects within this field. One course, that had a great impact on us, was "creative idea management at work." Here we were introduced to the rather abstract and to some extent new field of research through practical assignments and theoretical lectures. This inspired us to choose creativity as a topic in our own master thesis. More specifically, we wanted to look at evaluation of ideas, and investigate which underlying factors that might influence the evaluative processes, in the spirit of Marc Runco.

The whole process was started by collecting data for our analysis. Marit Rinnan and the municipal of Bergen as well as Birthe Kaafjord Lange and Anne Horne at the evening courses at NHH were all welcoming and open when we needed subjects for our research. We are truly grateful for their help.

The work on a master's thesis has many stages. It has been frustrating at times, but most of all it has been both interesting and educational. Fortunately, we had the reassurance of helpful advisors that have provided us with support and input in times of need. Mark Runco has contributed not only as a solid advisor, but also served as an inspiration for our work. At the same time we would like to thank Geir Kaufmann for his guidance. We would also like to thank them both for the independence we were given in our work.

2 Executive summary

During the past decades, researchers have increasingly been interested in *creativity* as a field of study. Many models and theories emphasize the *evaluation* of creative ideas, but this subset of creativity research is still understudied and not yet fully understood. Common for creativity and evaluation research is the fact that both explore *individual, group, leadership* and more *aggregated levels* of the two processes.

By testing individual factors against *evaluative accuracy* of *popular* and *original* ideas among *business people*, we found that the attitude *preference for ideation* was negatively correlated to popular evaluative skills, while *preference for premature closure* was negatively correlated to both evaluations of popular and original ideas. *Ideational fluency* was significantly related to evaluative accuracy, but only with evaluative accuracy of popular ideas. *Working experience* was close to uncorrelated with evaluative accuracy, whereas a negative relationship was found between *leadership experience* and evaluative accuracy of popular ideas. Our final finding was that *educational length* positively and significantly correlated with evaluative accuracy of popular ideas.

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Introduction

Change has become part of our everyday life. We find new fashion trends every season, new technology outdoes old ones, and customers demand simpler solutions to everyday problems. We live in a materialistic society, where we always look for better products and an almost effortless solution to our problems. Organizations have to answer these demands and expectations from the customers. In some industries this has led to fierce competition and a threatening environment. Only the best organizations will survive. What then makes one organization better than another? Here, in the situation of continuous change, an organizations ability to adapt to the changes and to satisfy customers' needs is of great importance. One way to handle this problem is to emphasize ideation.

Divergent thinking or ideation may produce new ideas, but as stated by researchers such as Charles and Runco (2000-2001:418) the ideas might "lack the appropriateness of truly creative ideas and solutions". How well the ideas are evaluated affects the actual success of the ideas when implemented. It influences which ideas are acted upon in the organization and which projects get support. The significance of the evaluative aspect throughout the creative process should also be clear when we consider the focus on useful, adaptable and appropriate ideas in the creativity literature. Evaluation of ideas, consequently, is of great importance for an organization as well as the individual.

The above are some of the reasons why we have chosen evaluation of creative ideas as the main focus of this paper. By examining some personal attributes and individual factors, we want to see how these influence the accurate identification of original (statistically rare) and popular (statistically common) ideas. Before we present our study and findings, we provide a short overview of literature on creativity, and at the same time we relate it to studies of evaluation in the creative context.

4.4 Problem statement

Despite the relative importance of the evaluative component to creative solutions, only a few studies have been conducted within this field of research. We wanted to build on the success of Runco and Smith (1992), Runco and Vega (1990) and Charles and Runco (2000-2001) who all made great contributions to the study of evaluation and take a closer look at the evaluative factor of creativity. We therefore decided to look into how accurately original and popular ideas are evaluated by employees. Accurate evaluation affects not only employee's willingness to contribute, but more importantly it affects what ideas are acted upon and what ideas are rejected.

We wanted to look further into the study of evaluative accuracy. By evaluative accuracy we think of ability to successfully identify original (statistically rare) and popular (statistically common) ideas. In this context we believe that both personal factors, e.g. attitudes, and job factors e.g. working experience, influence the evaluative process. This led us to the following general research problem:

How do personal- and job factors predict evaluative accuracy?

4.5 Approach

Due to the comparatively little literature available within the field of evaluation, both in the context of research and theories, we decided to look at the theory in a more explorative manner. Some general theory is included to give grounds for our hypotheses and to look at evaluation of creative ideas in context.

To help answer the research problem above we developed a set of hypotheses. These explored specific relationships toward our two dependent variables evaluative accuracy of popular and original ideas. The independent variables we wanted to take a closer look at were divided into personal and job factors, and the aim was to identify the relationship between the different factors and evaluative accuracy. We had to limit ourselves to some individual factors because of lack of time and resources. Since we did not have empiric data to rely on when it came to

all our hypotheses we based some of them on our understanding of the concepts and the more general literature on creativity and evaluation. Data were collected through a number of questionnaires, divergent thinking tasks and evaluation forms given to 70 participants, all of which were currently active in business. Before presenting our research method and results in detail, we provide a short review of literature on creativity and look at how these areas relate to evaluation of creative ideas.

5 Literature review

The literature review is presented in general terms. The reason for this is that it provides insight into the context in which our study is performed, and serves as a theoretical background for our research problem and hypotheses. Later on, when we present our own research the discussion will be based on theories and other findings from this section of the paper.

5.1 Definitions

The key words for this paper are *creativity* and *evaluation*, as well as *inter/ intrapersonal evaluation* and *popular ideas*. It is important for the reader to understand the meaning of these terms. In addition, different researchers talk about different meanings and aspects when they refer to the concepts. We will briefly present some of the points of view, and choose which interpretation we will use throughout this paper.

5.1.1 Creativity

Many definitions of creativity exist. The concept has many dimensions, and the definitions emphasize different aspects of it. However, at a general level there seem to be agreement that a truly creative solution has to be both *original* and *useful*. Researchers have also emphasized the need for realization of the idea, containing an element of evaluation and elaboration. Although there seem to be agreement about the novelty (originality) component of creativity, there is some disagreement about the meaning of the concept. Some researchers argue that a truly novel idea is one that is new to the world. This kind of objective novelty is what Boden

(1994) calls historical creativity. Another view is that the novelty component is fulfilled as long as the idea is new to the person who comes up with it, according to Boden, this kind of psychological creativity is sufficient. Kaufmann (2004:9) makes a clearer distinction between creativity and innovation, but he too argues to “settle for subjective novelty as sufficient to most of the needs involved in the scientific pursuit of creativity.” Even more important to our paper is the discussion on appropriateness, because evaluation is necessary to identify the useful ideas. An idea is useful if it is workable. When reviewing art, it may be difficult, if not impossible, to decide the usefulness of the piece. In these situations it may be more suitable to evaluate if the art is valuable or appropriate.

Amabile (1992) includes a third element in her definition; the nature of the task. There is no room for creativity in algorithmic tasks, where there exists only one correct answer, and when the way of getting this answer is straightforward. Amabile suggests that the task needs to be heuristic for solutions to be creative, it has to be open-ended and both the paths and solutions chosen may differ. In our research the participants are asked to perform a series of divergent thinking tasks. These tasks are highly open-ended, only the imagination sets boundaries for the quantity and quality of the solutions. The nature of the divergent thinking tasks will be presented in more detail in the methodology section of this paper.

Kaufmann (2004) identifies two types of novelty possible for creative solutions, the task itself may be novel and/or the solution may be novel. This is described in his model of two faces of creativity. Different situations call for different types of problem solving and creativity. When both the task and the solution is familiar there is no need to be creative, and one can rely on routine problem solving. This is in a way similar to Amabile’s algorithmic tasks. Sometimes, however we may find better ways of handling a routine task. One becomes aware of drawbacks in the existing method of doing things and seeks better solutions. This is called proactive creativity. In the third scenario an old solution is transformed into a novel task by intelligent adaption. The final scenario in the novelty-creativity taxonomy is where both the task and the solution are novel. Often this category is thought to be the one that requires most creativity. However, in this kind of creativity, the problem is given, while in proactive creativity, the problem has to be discovered as well as the solution to the problem.

In organizations it is likely that ideas will be evaluated as creative if they are both novel and appropriate. When evaluating ideas, an idea may be seen as novel when it is new to the

organization. However, for the organization, it is very important that the idea actually solves a problem, that it is appropriate and useful. Kaufmann (2004) explains how creativity may have both novel problems and novel solutions. This may have essential implications for evaluation of an idea. It may be that solutions to old problems are more appreciated. Here, the problem is already accepted and the need for a solution or change is recognized. Consequently ideas that may help solve the problem are valued and may be evaluated as creative in the sense that it is perceived as novel and appropriate.

Evaluating solutions to new problems directly involves evaluating first the problem, then the solution. This two-stage evaluation process may be very complex. One has to consider new and unknown aspects to both the problem and the solution. It is in these situations truly creative ideas may come into existence, but evaluating these ideas might be increasingly difficult.

Although it may be difficult to assess whether an idea is novel, because people have different views and experiences, it is even more difficult to evaluate the usefulness of a problem or a solution. In organizations it is possible that usefulness is valued more than novelty, because it is usefulness that makes processes within the organization work. Problems with accurate evaluation of creative ideas may cause employees to suppress creative thought and instead look for only useful solutions. Even so, it may be that organizations that enhance creative thinking and look for both new problems and new solutions are better off in the competitive market.

One organization that has benefited from its creative employees is 3M. They consider the impact of creative ideas to be so conducive for the organization that they direct their employees to spend 10-15 per cent of their working hours on creative thoughts and developing new ideas (project management lecture, 2005). The idea behind this strategy is that the time and resources provided by the organization will result in valuable insight, improvements, products and processes. Here, the employees are not afraid of coming up with seemingly “crazy” ideas or solutions, because this is valued. Original ideas are getting fair treatment and evaluation.

For the purpose of this paper we have chosen MacKinnon’s (1962: 485) definition of creativity.

It involves a response or an idea that is novel or at least statistically infrequent. But novelty or originality of thought or action, while a necessary aspect of creativity, is not sufficient. If a response is to lay claim to being a part of the creative process, it must to some extent be adaptable to, or of, reality. It must serve to solve a problem, fit a situation or accomplish some recognizable goal. And, thirdly, true creativeness involves a sustaining of the original insight, an evaluation and elaboration of it, a developing of it to the full. Creativity, from this point of view, is a process extended in time and characterized by originality, adaptiveness, and realization

This is a comprehensive definition that includes all three imperative aspects of creativity. It is especially useful for us because it can be used regardless of domain and because it acknowledges the possibility of private creativity or creativity within a population, looking at statistical infrequency rather than absolute novelty,

5.1.2 Evaluation

Evaluative accuracy has been recognized long ago to be an important factor when it comes to creativity. As early as 1959 Guilford included evaluation as one of the basic dimensions in his structure-of-intellect-model (SOI). He defined evaluation as “reaching decisions as to the accuracy, goodness, suitability, or workability of information” (Guilford, 1959:470). Indeed, an important aspect of the creative product or idea is its appropriateness or usefulness. Useful or appropriate implies a fit, only found and recognized when evaluating the potentially creative outcome. Therefore, evaluative accuracy should be taken into account when businesses try to increase the creative outcome of their employees. Some have suggested that evaluation is one of the stages in the creative process, others that evaluation is involved in most of the faces of the ideational process (Runco & Chand, 1994). Brainstorming (Osborn, 1953) is one example of a theory which recommends that evaluation should be conducted only within certain parts of the creative process. One has to separate idea generation and idea evaluation during the problem solving process. Wallas (1926) is another, looking at evaluation as the 4th stage of the creative process, the verification stage. The research on this has been mostly unsupportive.

Houtz et al. (1979) found that it was difficult to postpone judgment and that creative problem solvers are likely to monitor their progress in evaluative and metacognitive ways throughout the creative process. Looking at psychoeconomic theory, where time and resources spent on

gaining knowledge and experience are seen as investments, we can find a similar explanation. “It is misleading and infeasible to actually postpone judgment, given that judgment is an integral part of ideation and divergent thinking. It is what keeps ideation from being entirely unreasonable” (Rubenson & Runco, 1995:11). Guilford (1967) also suggests that evaluation was conducted throughout the stages of creative thinking and problem solving. Another important fact is that evaluation should not be confused with similar concepts. Evaluation has previously been used as a synonym to critical thinking (Feldhusen & Eng Goh, 1995). Research seems to indicate, however, that the two are distinct (Runco & Smith, 1992). This will be further discussed when we cover the area of intelligence.

Evaluative accuracy should be viewed as one of many skills and attitudes required for creativity. Research suggests that more complex/ multidimensional models of creativity will be more realistic. Therefore we will try to find links to areas such as attitudes, knowledge, motivation and leadership when we look at evaluative accuracy.

In this paper evaluation will be seen as judgment. Participants in our study are to judge ideas and try to identify which ideas are creative, and which ideas are not. In our hypotheses the term evaluative accuracy will be used and understood as the ability to successfully identify original and non-original ideas. The participants’ evaluations are objectively identified as right or wrong. In this context it seems appropriate to define evaluation, or active convergence, as “the application of judgment to the generated options to select the most significant options” (Basadur, Runco & Vega 2000:100).

5.1.3 Popular ideas and inter/ intrapersonal evaluation

We will also include a short explanation of what we think of when we use the terms popular ideas and inter/ intrapersonal evaluation. This section is incorporated to ease the reading of the rest of the thesis.

In this context the term *popular ideas* signify ideas that are statistically common. When given divergent thinking tasks popular ideas are ideas that respondents frequently mention. It has been used the same way previously in the work of Runco and Smith (1992), Runco and Vega

(1990) and Charles and Runco (2000-2001), among others. Popularity is antithetical to originality and can be more easily operationalized (Runco & Smith, 1992).

Interpersonal evaluation is the evaluation of other people's ideas. Examples of interpersonal evaluation are the work of art critics or a leader's choice between different ideas put forth by subordinates. *Intrapersonal evaluation* is a person's evaluation of his or her own ideas. This kind of evaluation is conducted constantly when choosing which ideas to share with co-workers or which ideas an individual want to pursue. In our research we will focus on interpersonal evaluative skill, given our focus on evaluation in a business setting.

5.2 Perspectives

The creativity research is best understood by considering various perspectives. When studying creativity, and consequently also evaluation, the choice of perspective influences measurements, methods and how the results can be understood. We will therefore in the next section provide a short overview of the various perspectives.

5.2.1 Person, process, product, press

A common way of classifying the research is into the categories of person, process, product and press (Runco, 2004). The *person* category emphasizes personal characteristics of the creative person. This includes both personality and traits usually found in creative people. Mumford et al. (2002) characterize creative people as having great expertise, achievement motivation, autonomy, openness, flexibility, cognitive complexity, self-confidence, dominance and introversion. In addition this category takes a closer look at creativity by looking at what motivates creative people. Amabile (1992) argues that creative solutions occur more often when people are intrinsically motivated. Intrinsic motivation is inhibited by external factors such as rewards, time limits, evaluation etc. (Deci & Ryan, 2000).

This position may also be taken when studying evaluation. For example, studies have found that traditional measures of intelligence, such as SOI-scores and grade point average, are not related to evaluative accuracy (Runco & Smith, 1992).

It is difficult to discuss evaluation without taking idea generation into consideration. In this sense, it is quite handy that the next category of creativity is the *process* of coming up with novel ideas. It takes a closer look at the behavioral aspect of creativity, and the different stages of creativity. There exist many process models of creativity and most of them include an evaluative aspect. One that is widely used is the old theory of preparation, incubation, illumination and verification stage. In the context of this paper, it is the last stage that is most interesting. This stage involves evaluating, testing and implementation of the idea, and making sure that it is useful. Verification, or evaluation, as referred to here, involves identifying strengths and weaknesses with the idea, all in all evaluating appropriateness. Earlier in the paper we explained the conflicting view among researchers when it comes to the evaluation activity in the creative process. Evaluation is thought of as an activity or stage separated from the rest of the stages, or as an activity that takes place at every stage of the process. The latter one has won the most support, but in the preparation, incubation, illumination, verification theory, it seems that evaluation is performed in only the last stage of the model.

Runco & Chand (1994) have presented another theory of creative processes, the two tiered model of creativity. This theory will be described in further detail below. One of the main differences is that this second model includes motivational influences of the individual. In addition this model emphasizes the importance of evaluating throughout the whole process. No activity is separated from another, instead they take place simultaneously.

Creativity research is often very *product*-oriented and the focus is on the results of the creative efforts. Sometimes numbers of products is a measure of how creative a person is. In this case it is important to remember that quantity is not dependent on a person's creative ability, rather his or her productivity. To be effective is not the same as being creative. A product is creative if it is able to impress a qualified audience. This category is particularly important in the evaluative context. Here, an idea is seen as creative if it is evaluated as creative by a qualified audience. It is possible that the audience's personal traits, experience and other characteristics influence which ideas are accepted as creative.

The last approach to studying creativity is *press*. This is the situational aspects of creativity. Structure, climate and relationships in an organization may influence creative processes. Research in this area concentrates on inhibitors of creativity in an organization. Both

creativity and evaluation may be affected by for example time constraints, surroundings and situational pressure.

In addition to the four P's, Simonton (1990) added *persuasion*, as an important element when it comes to creativity. The ability a person has to persuade others of the value of one's ideas, might be the factor that separates the successful from the not so successful ideas. When persuading others, one actually changes an evaluator's judgment of an idea. One tries to influence the evaluator to believe that an idea brings about both novel and appropriate elements.

5.2.2 Disciplines

All research on creativity can not be put into the person, product, process, press categories. To cover the whole range of dimensions and themes connected to the field we need to consider studies within more disciplines, such as behavioral, biological, clinical, cognitive, historiometric, organizational, psychometric, and social perspectives (Runco, 2004). We will briefly discuss some of these perspectives below.

Cognitive research has emphasized basic cognitive processes such as memory, attention and knowledge, and on tactics and strategies connected with producing creative solutions. Economic theories discuss the importance of socioeconomic status and the costs of creative efforts. Research within the organizational perspective is "intended to forward knowledge about creativity in organizations... resources and autonomy seem to be relevant to organizational creativity" (Runco, 2004:671). In the social research one has been interested in social processes within the family, educational settings, teams and within the organization. "The categories of research... suggest that in many ways creativity research has broadened its scope in the past 20 years," (Runco, 2004:673).

5.2.3 The two-tiered model

The two-tiered model, as mentioned before, is a componential model of creativity (Runco & Chand, 1994), and falls under the process category. It illustrates the relationship between

individual characteristics, motivation and knowledge, and the creative process from problem finding through ideation to evaluation and is included to take a closer look at how the evaluative elements fit into the creative process. In our study we identify levels of experience (knowledge) and creativity and then look at how these individual factors might influence evaluative accuracy. The two-tiered model includes many of the aspects we are interested in, shows a possible relationship between these variables, and describes how they might influence each other. We decided to include this model in our paper, not only to give an example of a model developed in the process perspective, but also because of the interesting factors included in the model. In addition this model gives useful insights to our discussion later in the paper. Most importantly, however, this model illustrates how evaluation occurs at every stage of the creativity process.

A creative process often begins by identifying and constructing a problem. We recognize that we have a problem on our hands, or a challenge that has to be overcome. An example of this could be a plant manager who finds certain processes to take too long. The second step in the problem finding stage is to define the problem, through definitions and redefinitions we change the problem. An identified problem as defined in a particular way may not have a solution. The problem, however, is still there. By changing perspective we can arrive at a problem definition that is workable, in the sense that it leads to a solution.

The next stage is the ideation phase, where solutions to the problem are generated. Ideation can vary in terms of fluency, originality and flexibility. Fluency tells us about the productivity of the individual, how many ideas he or she is able to come up with. The ideas tell us something about possible solutions and options in the problem solving process. Ideas vary in their originality. Some ideas are more unique and unusual than others. Individuals who produce such novel ideas often see the problem from different perspectives or are able to see connections in what appears to be quite different things. Originality is necessary for creativity, but it is not enough. The idea also has to be useful or have value. Flexible solutions are the result of looking at the problem from different angles.

The final stage of the two-tiered model, evaluation, is the most relevant one in the present context. The relevant ideas are examined for their strengths and weaknesses and for their appropriateness. In the discussion it may be useful to use such strategies as playing the devil's advocacy to ensure critical thinking. In addition an element of creative thinking is necessary.

Original ideas are encouraged, but such ideas can be difficult to evaluate. By using creative thinking the individual can recognize potential in original ideas. Since this aspect of creativity is most relevant to the empirical issue at stake here, we have devoted a whole section in our paper to the problems concerning evaluation of creative ideas.

On the account of the two tiered model, the creative process is influenced by the individuals’ motivation and knowledge. Both intrinsic and extrinsic motivations are included in the model. The knowledge needed in the process of creativity is both declarative and procedural. Later on, in this paper we will present more theory on motivation, knowledge and other individual traits and characteristics that influence creative and evaluative potential.

This model is relevant in the context of evaluation because it stresses the fact that evaluation is essential to creativity. Without evaluation one might come up with inappropriate problems and waste time on unproductive ideation. The creativity process is not complete until evaluation has taken place. The figure below shows the model.

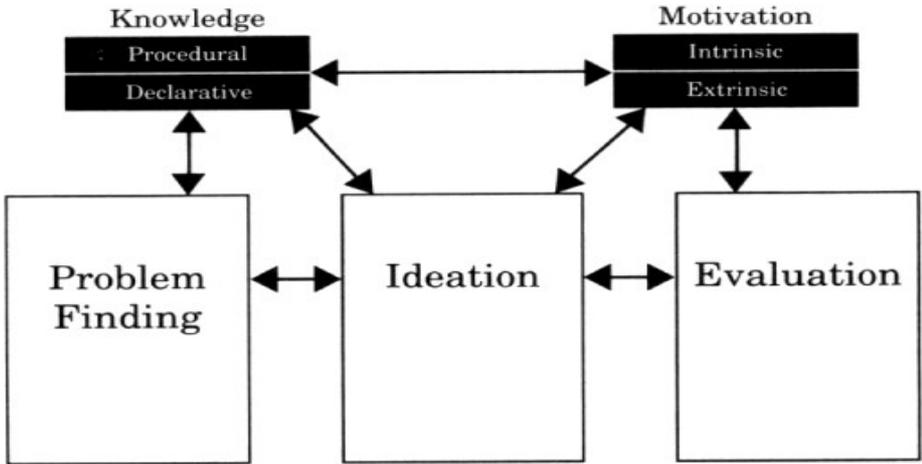


Fig. 1. Two-tier model of creative thinking. The three boxes on the primary tier each represent sets of skills. Problem finding represents problem identification, problem definition, and so on. Ideation represents ideational fluency, originality, and flexibility. Evaluation represents valuation and critical evaluation. Additional components and details are given in the text.

Figure 1: The two-tier model of creative thinking

5.3 The Psychoeconomic Approach to Creativity

Rubenson and Runco (1992) suggested that the theory of human capital could be used also in the area of creative potential. We have chosen to include this theory because it has the advantage of generality and implications that could be closely connected to evaluation. The implications also have the benefit of being empirically testable. In addition, the theory links two areas of interest to us, economy and creativity. Elements from the model have also provided imperative insights when formulating and arguing for our hypotheses and bettered our understanding of the role of knowledge and investments. The theory can also be of great importance because it is logical, concrete, has a great deal of explanatory power and because it has “proven consistent with a great deal of empirical evidence on creative performance” (Rubenson and Runco: 4, 1995). The predictions of the psychoeconomic approach to creativity will be further discussed underneath the different sections of individual creativity and leadership.

The theory of human capital, most clearly articulated by Becker (1975) is widely used to enable managers to make better personnel decisions. The theory applies to the acquisition of skills/ investments in human capital. The framework is the same as in the theory of physical capital, but it analyzes people and skills in stead of machines and plants. If the costs are lower than the benefits of buying a machine, the theory predicts that you should buy it. In the same way, the human capital theory tells you whether you should continue in school, or start working, whether a company should invest in on-the-job training, and how much it should invest. The cost normally consists of opportunity cost (forgone income, time etc.), and the direct costs (books, tuition). The decision is also dependent on the net present value of the flow of additional revenues generated by your investment. This implies that you also have to look at the expected benefits of the investment, and the interest rate. One of the advantages of the human capital model is that it allows for individual differences. One person might value a dollar today a lot more than a dollar tomorrow while others might differentiate less. The costs of going to school might be different because some learn with less effort than others. The human capital theory is often associated with monetary calculations, but the theory also allows for non-pecuniary benefits.

The implications and testability of the hypotheses derived from the human capital theory, gives us a reason to analyze creative potential within the same framework. Rubenson and Runco (1992) emphasize that creative potential and creative behavior should be considered one component of an individual's human capital. The optimal level of investment in creative potential is the rate of investment where the marginal benefit of the last unit acquired is equal to the marginal cost (Rubenson and Runco, 1992). The costs and benefits of activities to increase your creative potential could be monetary or non-monetary in nature. The opportunity cost of the investment is often associated with time or the forgone opportunity to do something else. Direct costs are quite similar to the ones described in the section above and again the interest rate is dependent on how much weight an individual puts on money today. Individuals also encounter psychic costs; the costs will differ from individual to individual. The benefits could be personal or tied to a job. It will vary dependent on for example age, occupation, interests and former investments in creative potential. The latter implies that the first active investment you undertake might be more valuable than the last. This is often referred to as diminishing marginal benefits in the economic literature. The psychoeconomic theory acknowledges the possibility of diminishing marginal benefit, but it is not dependent on it.

Rubenson and Runco (1992) looked at the implications of the theory both on an individual basis and in an aggregate supply/ demand perspective. They also look at the implications for groups (Rubenson & Runco, 1995) considering the fact that a lot of contemporary creative work is undergone in a group setting. The implications for groups will not be examined in great detail because our research will be conducted on an individual level. We will focus on the predictions that are of importance to our work on evaluation. For a group to be successful the individuals need to be able to differentiate between appropriate and non-appropriate ideas. Rubenson and Runco imply that experience is a necessary prerequisite for evaluative accuracy. Experience can contribute to an individual's ability to come up with new ideas and recognize the ideas that are worth pursuing. Unfortunately, because of the sizeable investment experts have made to obtain knowledge within a field, they tend to become somewhat inflexible. "The expert may reject new data or opportunities, or anything that is contrary to his or her investment, even if objectively they seem to lead in a useful direction" (Runco, 1994). This could have great significance when we look at how experts evaluate creative ideas. An expert might have an incentive not to pursue a viable idea. The reason for this is that a large investment leaves a person with a lot to loose if a new perspective replaced the one they have

invested in. This is in accordance to what has been found in research on knowledge. A lot of knowledge within a field leads to a resistance toward change.

Expertise is closely related to age, because it takes a few years to obtain the amount of knowledge needed to become an expert. This does not imply that all older adults are inflexible when they choose which ideas are viable, but that there is a reason for a tendency toward rigidity when you have invested in knowledge throughout your life. Flexibility is one of the factors contributing to divergent thinking and adaptation. Looking back at the chapter on evaluation and knowledge, we found that knowledge was a prerequisite for good judgments. This leads us to a possible trade-off situation between necessary knowledge and flexibility.

Structure imposed by organizers can be of great importance to creative work. The “Psychoeconomic theory leads to the prediction that there is an optimal amount of structure which facilitates creative thinking and creative exchanges” (Rubenson & Runco 1995:13). Important factors in this sense are tension and time constraints which can influence judgment and ideation. We will take a closer look at these factors when looking at method.

6 Individual creativity

The literature on creativity is meant to be a starting point to our discussion about evaluation. As we have seen, evaluation can be considered as a factor in the creative process and it is all interconnected. We therefore need to take a closer look at some aspects of creativity to get a better understanding of evaluation. When studying creativity at the individual level there are several factors to consider. Helson (1988:29) explains how studies have been focused on the “identification of creative persons and in the conceptualization, description and measurement of cognitive- motivational structures characteristic of these individuals.” The interesting question is why some people show exceptional creative abilities and where this creativity comes from. One can also ask oneself if every person has creative potential. In the following chapters we will address these questions and try to find traits and characteristics that characterize creative individuals.

Our main focus is to look at how the same traits and characteristics relate to evaluative accuracy. At times it has been difficult finding relevant information on the relationship, given

the relative little research on evaluation. Nevertheless, we will explore the possibility that some attributes are related to evaluative potential. Some of the theory in this section is important for our discussion because it is closely connected to the areas we explore in our research. It is also necessary to include some general theory to justify our choice of hypotheses and independent variables.

We have chosen to discuss personal factors that we want to investigate in our own study. The reason for the literature review is to provide a better understanding of the context our study is a part of. It is important to look at the creative problem solving process as a whole to understand the role and impact of evaluation. The factors we have chosen to focus on are knowledge, intelligence, cognition, personality, motivation, attitudes and creative potential. Knowledge, cognition, attitudes, intelligence and divergent thinking/ creative potential are all factors that will be included in our investigation. The sections on personality and motivation are included to give a more comprehensive picture of the creative problem solving process and because these are areas we touch in on in our discussion.

6.1 Knowledge

In our own study we have several factors that are related to knowledge. The predictor variables working experience, leadership experience and education all reflect the knowledge gained through experiences of the participants. We have some hypotheses regarding experience and evaluative potential, and in the reasoning for the hypotheses and in the explanation of the results, we use insight gained through the review of knowledge literature.

Two different opinions exist concerning creativity and knowledge. One group of researchers relies on the foundation view. Gardner (1993) introduced the 10-year-rule, where he claimed that it takes a person about ten years to become an expert in a field. Researchers in favor of this view argue that during these ten years one is occupied with deliberate practice to develop an understanding of the field or domain. There are many examples of “geniuses” that have spent many years of practicing and trial and error before they became truly creative and produced new and interesting material. It is possible that knowledge gained through experience leads to better understanding and hence, better evaluative potential. Practice and experience gives a better understanding of the problems related to the field and possible

solutions. Perhaps people with experience are likely to make better decisions as to which ideas are good and worth pursuing. More research is necessary to get a comprehensive understanding of how knowledge is used in creative thinking.

The second view is the tension view, where it is believed that there is a right amount of knowledge that is optimal in creative efforts. To be creative one needs some knowledge that serves as building blocks. It is impossible to be creative and to come up with new and useful solutions and ideas if one is not familiar with the domain and has some knowledge about how things work within the particular field. But if this knowledge is too strong it may lead to inertia and reliance on past experience. This may hinder creative thought and consequently lead to non-creative solutions. One example of this can be found in the studies of Smith et al. (1993), where the results of the research was that people who were shown possible solutions to a problem came up with similar solutions whereas people who weren't exposed to possible solutions produced more creative solutions with new and different attributes. Findings like this have led some researchers to believe that the connection between knowledge and creativity can be shown graphical as an inverted U-shape.

In the section on psychoeconomic approach to creativity we mentioned that knowledge or experience was of great importance also when we look at the evaluation of ideas. A person with a lot of experience can be prone to evaluate the ideas that have led to success in the past favorably. This could affect the choice of ideas towards ideas that lack the novelty-element. On the other hand, a person that has a great deal of experience identifying creative ideas should have an advantage over the ones with less experience. We will take a closer look at this aspect under evaluation and leadership, considering the importance of identification of valuable ideas for leaders. The final choice of which ideas to pursue is often left to leaders.

Sternberg and O'Hara (2004) also recognize that knowledge can be a "double-edged sword". Knowledge is a necessary prerequisite for enhancement within a field, because one has to know about other ideas to know if a new idea is in fact novel. Unfortunately, there is also research that suggest that knowledge impede creativity, because "the individual can become so used to seeing things in a certain way that he or she starts to have trouble seeing them, or even imagining them, in any other way" (Sternberg & O'Hara (2004:256).

Koehler and Harvey (2004) emphasize the positive effects of knowledge on evaluation. They look at the importance of contextual variables when evaluating ideas and alternatives. As an example they suggest that employees may place a smaller value on a salary of \$40,000 if your colleagues earn more, than they would a salary of \$35,000 where your colleagues earn less. Direct evaluation between the two alternatives, however, leads to the first salary being preferred over the latter. The implication of these evaluability effects is that attributes that are difficult to assess on its own are easier to evaluate when comparing them to related attributes. Evaluation of one idea may also differ as the framing of the idea differ. General knowledge can thus by means of comparison contribute to better evaluation. This is in accordance to Sternberg and O'Hara (2004).

The investment in increased knowledge can be made through training of a person's evaluative ability and creative potential. Not that much research has been conducted within the area of evaluation and knowledge, but Runco & Basadur showed some findings of interest in their research on management and training in 1993. They assessed the evaluative skill of 35 managers using open ended, work related tasks. The participants were asked to score their own answers/ ideas from entirely unoriginal (1) to highly original (7). Two of the tasks were administered before training, two of them after. Runco and Basadur (1993:170) wrote that "the most important result of this investigation was that training had a significant impact on the evaluative abilities of the managers. In fact, the impact of training was apparent in that managers improved both their accuracy at identifying original ideas (i.e the number of correct ratings increased) and their accuracy in identifying unoriginal ideas (i.e the number of incorrect ratings decreased)". The training conducted covered different elements of the creative process, looking at both the apprehension and understanding of knowledge. The investigation showed that training focusing on a complete creative problem solving process could have a significant effect on evaluative skill. This leads to the prediction that knowledge on creativity is important to the correct identification of ideas. It is further recognized by Bailin (1991:123) in that "The process of execution involves testing ideas, evaluating them, dealing with and learning from surprises and unforeseen consequences and developments, and making changes in the original plan or idea based on what is learnt".

6.2 Intelligence

Intelligence is included in the paper because it was a relevant subject of research for our paper. The theory below serves as grounds for our choice of hypotheses and what factors to include in our analyses. The subject is also closely related to knowledge. This can be shown by presenting one definition of intelligence. Intelligence is the “ability to purposively adapt to, shape and select environments” (Sternberg & O’Hara, 1999). This requires, among other things, knowledge about the environment. In creative endeavors intelligence is often seen as an important factor. Just as there exist different views on the importance of knowledge in the creative process, there are several opinions about the relevance of intelligence in regard to creativity. The most common view today is that creativity and intelligence share some similarities, but in some ways they differ (the overlapping view). Sternberg and O’Hara (1999) argue that synthetic, analytical and practical aspects of intelligence taken together may lead to creative thought.

Studies examining correlations between IQ and creativity report different results. Correlations vary from low to moderate. “The correlation depends in part upon what aspects of creativity and intelligence are being measured and how they are being measured, as well as in what field the creativity is manifested” (Sternberg & O’Hara, 1999:262). A main conclusion seems to be, however, that the intelligence of creative people is above average, but when IQ is above 120 creativity and intelligence are only weakly or not at all correlated.

Both Sternberg and Guilford argue that standard tests are not adequate to tell whether a person is intelligent or not. IQ tests report only of ability to acquire book learning, and in many cases this is not enough to be successful. Conventional intelligence tests also give little opportunity to solve problems in creative ways. “Most of our problem solving in everyday life involves creative thinking. Yet in our educational practices we tend to emphasize teaching students how to find conventional answers,” (Guilford, 1968). Sternberg and Guilford extend the concept of intelligence to involve something more than plain book learning skills, there are practical aspects to it, and different persons may have different strengths and weaknesses and still receive the same IQ scores. Different persons are just better equipped in different tasks or situations.

Guilford (1968) also included an evaluative aspect to his structure of the intellect model (SOI) under the dimension operation. This dimension is interconnected to the content and the product-dimensions and should be viewed as a whole. Many of the elements of the model were not measured by the typical intelligence-tests, suggesting that the creative elements are not to be confused with convergent thinking.

“Creativity seems to involve synthetic, analytical and practical aspects of intelligence,” (Sternberg & O’Hara, 2004:269). They suggest that one should be using synthetic intelligence to come up with new and interesting ideas, by going beyond the given, but one has to use analytical intelligence to analyze and evaluate these ideas. “If a given idea is worth pursuing, analytical ability can further be used to evaluate strengths and weaknesses of the idea” (Sternberg & O’Hara, 2004:256). By analytical intelligence we mean the subset of intelligence that is in part measured by traditional tests of intelligence. This is an interesting view that might contribute to a better understanding of our aim to look at creativity and evaluation at the same time. It seems Sternberg and O’Hara, in the intelligence context, recognizes the importance of both creativity and evaluation. Unfortunately, not enough research has been conducted within the field of intelligence and creativity to confirm such a view. Even so, a realistic theory of intelligence should include elements that contribute to coming up with new ideas as well as the evaluation of usefulness or the value of these ideas. Understanding intelligence in the creativity/evaluation context is best done when considering a mix of different intelligences at the same time. The most creative persons will have the “right” mixture of these intelligences, but Sternberg and O’Hara (2004) also suggest that there is a possibility for cooperation between individuals with different amounts of synthetic, analytical and practical intelligence.

Some studies are performed to explore the relationship between evaluation and intelligence. Runco and Smith (1992) included a measure of evaluative skill as Guilford defined it in his structure of the intellect (SI). In addition, they administered a measure of inter- and intra-evaluative accuracy looking at both popular (statistically common) and original (statistically rare) ideas. They found that all the measures of evaluative accuracy were unrelated to the SOI-scores and grade point average. This demonstrated the fact that evaluative accuracy was unrelated to traditional measures of critical and convergent thinking (Runco & Smith, 1992). With that it demonstrates that one should differentiate between the use of the terms critical/

convergent thinking and evaluation. Today these are often used interchangeably. In addition, grade point average is often tied to analytical intelligence, as described by Sternberg and O'Hara (2004). The fact that grade point average is unrelated to evaluative accuracy suggests that evaluation goes beyond analytical intelligence. "The nonsignificant correlations between the SOI scores and the scores from the evaluative tasks support the discriminant validity of the latter, and they suggest that the evaluation of ideas (for creativity) may not depend on the skills assessed by the more traditional measures of critical thinking (Runco & Smith, 1992:12).

6.3 Cognition

In our study we do not attempt to measure cognitive capacities. The lack of present research within the subject made the assessment complex. Nevertheless, mental processes and the use of diverse strategies may help explain differences in evaluative accuracy that become visible in our research results. We have therefore included a chapter on the subject in our literature review to look at possible connections between human cognition and evaluation.

Ward et al (1999) claim "that a) the hallmark of normative human cognition is its generative capacity to move beyond discrete stored experiences, b) the processes that underlie this generativity are open to rigorous experimental investigation, and c) creative accomplishments, from the most mundane to the most extraordinary, are based on those ordinary mental processes, that at least in principle, are observable." Based on these assumptions they form the creative cognition approach to the theme of creativity. The fact that people differ in their ability to generate creative ideas and solutions is explained by "variations in the use of specifiable processes or combinations of processes, the intensity of application of such processes, the richness or flexibility of stored cognitive structures to which processes are applied, the capacity of memory systems, and other known and observable fundamental cognitive principles."

Finke (1992) also tried to explain human creativity based on mental operations. A combination of generative and exploratory processes leads to creative thinking. By using ones memory, associations, combinations, analogical thinking and other generative strategies one

can come up with new insight. The exploratory processes consist of search and evaluation of ideas.

Several cognitive factors may influence creative thought. Insight, partly based on unconscious thought processes, is believed to be such a factor. Metacognition is the process where people consciously perform such control and surveillance over own thoughts. Other mental processes may be extending familiar concepts by adding new dimensions to familiar idea or conceptual combinations where two different concepts are taken together to give a new understanding. Over we have discussed the impact of recently activated knowledge and how this may influence creative thought and actually limit the search for possible solutions. Researchers also emphasize attention and memory in relation to cognitive aspects of creativity.

Little literature is to be found on the relationship between cognition and evaluation. It is possible that memory and associations influence evaluation in a similar way as knowledge. Metacognition may improve ability to actively keep an open mind when evaluating. Groborz and Necka (2003) found that cognitive control allowed more accurate evaluation of other people's ideas, but only in the case of participants with a particular cognitive processing style. Runco and Smith (1992) mentioned the importance of strategies and knowledge in the evaluation of ideas. Earlier research has discovered that there is a difference between the evaluation of popular and original ideas, Runco and Smith (1992) suggest that this could be because the strategies used may differ. When evaluating popular ideas the assessor could use their knowledge of other ideational options they have thought of. Runco and Smith (1992: 12) also suggested possible strategies to be used for the evaluation of unique ideas: "One such strategy is to simply estimate how many other individuals would think of the same idea. If one's estimate is that not many others would think of that particular idea, a reasonable evaluation would be that it is an original idea".

6.4 Personality

Many scientists have tried to identify certain traits that characterize creative persons. Feist (1999) asked the question “Where does creativity come from?” and came up with a list of attributes that he found to be important for creative artists and scientists. The attempt to compare different sorts of creative people led to the following concluding remark (Feist, 1999:289): “certain personality traits consistently covary with creativity, yet there are some domain specificities.” Our study is performed in a business setting, where the participants are employed in both the public and private sector. In addition measurement of leadership experience in our participants allows for exploration of the leader experience- evaluation relationship. The range of this paper did not allow us to incorporate personality in our study, but when reading creativity literature personality is too big of a subject to be excluded from our paper.

The work of creative people is challenging in many ways, and it is therefore likely that particular traits are of importance. For one, the work is related to a lot of political efforts and often requires people to be persuasive and persistent. In addition persistence, self-esteem and self efficacy are important. The matter of expertise has been mentioned earlier in this paper. At the same time they need to be curious, flexible and open enough with regards to methods and solutions. Mumford (2002) also mentions creative peoples need for autonomy and dominance and that they sometimes are on the more introvert side of the scale. Helson (1988) characterizes creative people by independence, seriousness, low conformity, self-sufficiency and experimentation.

Other traits that have been explored in relation to creativity are heredity and age. As people get older it is more difficult to be creative when new learning and unlearning is needed. This may be explained by psycoeconomic theory as described earlier in the paper. The theory of age has been supported, challenged and extended. Noe om at vi har med alder?

Very little research is done to find personality traits that are related to evaluative skills. Despite this we decided to include it in the literature review. Personality is what lies to ground for our every action and it is of great importance for behavior. When faced with complex and difficult creative tasks it is important to use analytical and evaluative skills to differ between good and bad decisions and solutions. Mumford et al. (2002:711) claim that

“creative people, while open and curious, will, at times, display a harsh, evaluative orientation with respect to their own work and that of others”. Personality will therefore be a very interesting topic of further research within the field of creative evaluation and is interconnected to the factors we will focus on in our study,

6.5 Motivation

We will only briefly mention a few important points when it comes to motivation, given that it is not investigated in our study. Even though, as we saw in the two tiered model of creative thinking, motivation plays a role when it comes to acquiring knowledge, coming up with problems, ideas and evaluating ideas. People’s willingness to contribute to the evaluative elements depends on their motivation. Motivation therefore needs to be considered when looking at how other factors relate to evaluation.

Amabile (1992) claims that a high level of motivation is required to be creative. Creative people are genuinely interested in their work; they show a great degree of personal involvement, and even love of their work. Some argue that being creative in their work fulfills the top level of Maslow’s hierarchy of motivation, self actualization. The creative aspects of the work, enables the people to achieve satisfaction beyond what’s expected.

Not only intrinsic motivation s creative thought. By rewarding creative efforts, variation and insight one can get people to break free from their usual way of thinking and spend time on bringing new ways of thinking and hopefully new and improved solutions on the table. There is one drawback with rewards, however. Overjustification occurs when persons exposed to the opportunity of being paid to do something start thinking of the work as something one has to do to get paid, and forgets the intrinsic motivation. This is may decrease the likelihood of creative thought.

Both rewards and intrinsic motivation makes people invest in creative potential and competencies. They spend time and effort on enhancing creativity and on coming up with creative insight. The problem is when so much energy is put into some idea, that one becomes defensive and insecure when criticized. After investing so much in the work they have more

to loose, and loose the flexibility that's important in creative work. This may also influence evaluation of ideas in a way to protect own investments.

6.6 Attitudes

Attitudes are of great importance to this paper. The link to evaluative accuracy has already been established by other researchers. In our paper we are going to build on their work, but in a different setting. In this section we explain the concept of attitudes and present some findings of the previous research.

Attitudes are “evaluative statements- either favorable or unfavorable- concerning objects, people or events. They reflect how one feels about something” (Robbins, 2005). Attitudes consist of a cognitive, an emotional and a behavioral component. Little research has examined whether certain attitudes will be more productive in the creative process and in evaluation phase. More general research however, provides insight about the concept. Specific attitudes influence the individuals in specific situations and based on observable attitudes in a human being it is possible to make predictions about how this individual will respond to certain stimulus.

If theory of attitudes are general, then we can say that certain attitudes will be favorable when coming up with creative ideas and when evaluating ideas. Some attitudes, “preference for premature closure” and “preference for ideation” have been found to be related to creativity. (Runco & Basadur, 1993), but other studies have not found a significant correlation between preference for ideation and divergent thinking results (Runco & Smith, 1992). Looking at the literature, preference for avoiding premature closure seems to be the most important, but also the preference for active divergence played a role. Both these attitudes enhanced the likelihood of performing ideation and evaluation behavior. Only individuals that have attitudes in favor of such processes are likely to perform them. This concept also applies for training of creative processes. It is not enough to train individuals or to teach them how to perform creative thinking efficient, one has to change the individuals' attitudes in order to change their behavior and their final results. (Basadur, Runco & Vega, 2000). This study also found that encouraging active divergence results in more ideas being generated, while encouraging avoidance of premature convergence leads to ideas being evaluated in greater

detail. In sum, better understanding of the two attitudes led to generation of more, better ideas. In addition Basadur and Hausdorf (1995) found that “valuing new ideas,” “creative individual stereotypes” and “too busy for new ideas” also predict creativity.

Only persons with attitudes in favor of an evaluative process are likely to perform evaluative activities. This is in line with the thinking of Basadur and Finkbeiner (1985), “unless the ideation-evaluation process is accepted attitudinally, then the process will not likely occur” (in Basadur, Runco & Vega, 2000: 82). If feelings of discomfort and waste of time are associated with evaluative efforts, then attitudinal theories would predict that the activity would not be emphasized. Basadur, Runco and Vega (2000) also discovered that the two attitudes were connected in that the avoidance of premature evaluation was a prerequisite for higher levels of active divergence.

Research on evaluative accuracy and attitudes, using the Basadur 14-item attitude inventory showed that there was a significant negative relationship between ideational preference and the popular (statistically frequent) evaluative score (Runco & Smith 1992). After a creativity training program, Runco and Basadur (1993) also found that evaluative skill was negatively related to preference for active divergence.

6.7 Creative potential/ Divergent thinking

Creativity is one of the main topics of our paper as a whole, but also in our own research. Creativity is difficult to assess, but divergent thinking-tasks have been used to look at creative potential. Before presenting our own results, we want to look at findings linking creative potential and evaluative accuracy. These will be presented in some detail, given the importance as foundation for our hypotheses.

Divergent thinking tests are often used to assess creative potential. They are normally scored in three different ways, trying to get a more complete picture of personal creativity. Ideational fluency measures the number of ideas produced, ideational originality measures how rare an idea is and creative flexibility refers to the ability to look at problems from different perspectives and consequently come up with ideas in different categories.

Research has shown a relationship between divergent thinking and evaluative accuracy. Runco and Basadur (1990) found that originality and fluency were significantly associated with evaluative scores, and in the same year Runco and Vega found a positive correlation between divergent thinking scores and evaluative accuracy. Runco and Basadur (1990) found that it was possible to enhance ideational skills and evaluative accuracy through training programs.

Studies concerning the relationship have concentrated on both intrapersonal evaluative accuracy and interpersonal evaluative accuracy, and how this is related to creativity. There exist evidence of significant correlations between intrapersonal evaluative accuracy and divergent thinking (Runco & Smith, 1992). Interpersonal scores were not significant. They also found that “individuals who are accurate in their judgments about ideas given by other people tended to be accurate in judgments about their own ideas” (Runco & Smith, 1992: 9). The same study concluded that people were more accurate in judging uniqueness of own ideas and more accurate in judging popularity of other people’s ideas. Attention, knowledge and strategy are helpful concepts in trying to explain these differences.

Runco and Smith tested both intrapersonal and interpersonal evaluative skill in 1992 and predicted a significant difference in evaluative accuracy between the two. This time they worked with college students in stead of managers as we have seen above. Some individuals consistently showed more accurately in their identification of popular, unique, inter and intrapersonal ideas than others. The result of the MANOVAs was none the less that there was a significant difference between the inter- intra-personal evaluative score. Other important findings were that a larger percentage of the ideas were identified correctly in the interpersonal evaluation than the intrapersonal. There was also a difference between the number of original and popular ideas identified.

Charles and Runco (2000-2001) did a similar study with 117 elementary school children. Two divergent tasks were administered orally and there was no time limit. The tasks were scored on fluency, flexibility, originality and cuing (scoring based on whether or not the idea given exists in the immediate environment). In addition, one of the tasks was scored on appropriateness. Three judges were used for this work. All of the types of scoring listed above will be discussed in more detail when we look at our own method.

The children were also asked to rate the originality of the ideas. Three highly original ideas (given by less than 1% of the sample), three moderately original ideas (given by between 4 and 7 % of the sample) and three common ideas (given by more than 10% of the sample) were selected for the children to evaluate. Each child was then asked to guess how many children gave the different ideas. Care was taken to ensure that the children understood the task and that they felt that it was a game, not a test. In addition to originality evaluation, the children were asked to rate the ideas according to their preferences. The three judges mostly agreed on the appropriateness of the different items, and none of the ideas presented were to be found in the child's immediate environment. The children were then asked to rate the ideas from "very bad" to "very good" and explain why they selected the rating.

A significant positive correlation was found between age and evaluations and age and preference for appropriateness. Gender on the other hand was unrelated to evaluative accuracy. Thus, from the third to the fifth grade the children would be more inclined to consider which ideas other children would come up with and which ideas they consider appropriate. They also found signs that older children were motivated to give a large number of ideas, increasing their fluency score more than their originality score.

6.8 Leadership

Till now, we have concentrated on individual creativity. Now we turn to a more aggregated level of creativity, and look at how leaders may influence the creative and evaluative processes in the organization. Our research include leadership experience as one of the main predictor variables, so it would be interesting too look at some theory about the relationship between leadership and creativity and leadership and evaluation before we go on to present our own study.

The term leadership has been defined in numerous ways, according to which aspects of the phenomenon the researcher was interested in. The one thing most of the definitions agree on is that it "involves a process whereby intentional influence is exerted by one person over other people to guide, structure, and facilitate activities and relationships in a group or organization" (Yukl, 2002:3). In the context of creativity we can suggest that we want a leader

to use influence to facilitate problem finding, ideation and evaluation (according to the two tiered model of the creative process, Runco and Chand, 1993).

Leadership has been an underestimated factor in the creativity literature, which has focused on the individual and his or her need for autonomy. Research suggests that the role of the leader is of great importance for creative performance. Leadership is among other things one of the important variables when we try to create a psychological climate that supports creative thought. Some creative leadership researchers have focused on the similarities between the creative person and the effective leader. “Though few writers in the field of leadership make explicit reference to the study of creativity, the current body of leadership literature reflects a strong conceptual relationship” (Puccio, 2004). Others have focused more on what leaders can do to enhance individual creativity.

In his review of the literature, Mumford et al. (2002:707) arrived at two important conclusions. The first one being that “leadership, at least certain types of leadership, is apparently related to creativity and innovations in “real world” settings”, second that “the influence tactics used by leaders apparently affect people’s willingness to engage in, and the success of, creative ventures”.

Creativity is a complex process, relying on interconnected factors such as motivation, personality and knowledge. Collaboration is often necessary to fulfill the need for expertise, but the creative person normally lacks some of the characteristics you need to become a good manager. They want autonomy and achievement, not power and affiliation. All of this supports the need for leadership. The nature of creative work and the fact that creativity can be highly time-/ resource consuming, sets creative leadership apart from leadership in other domains. There is also an ongoing struggle within an organization between the need for efficiency and effectiveness. The leader of creative ventures should therefore be persuasive and take organizational and customer context into account.

Even though there are domain differences among creative people and creative work, Mumford et al. (2002) found important similarities across domains. He concluded that there are sufficient similarities among creative efforts to allow us to talk about leadership as a general phenomenon. This gives us the opportunity to look at a more general theory for creative leadership, even if you should always have cross field content differences in mind.

“As the field of creativity matures there has been a growing recognition that creative behavior emerges from the interaction among the domains (i.e creative person, creative process, the environment and the creative product)” (Puccio, 2004:). When one looks at creative leadership different aspects of creativity must be considered. “Creative leadership, like creative achievement, must be understood in a multilevel framework” (Czikzentmihalyi 2004). Looking at the literature Mumford (2002) found that leading people consisted of providing support, freedom, intellectual stimulation and getting them involved. Leading the work is described as inducing structure through output expectations and feedback, project selection, diversity and contact. Given the uncertainty of creative work, it is important not to punish the employees for failure. In addition to creative people and creative work, Mumford (2002) looked at some of the implications of organizational influences.

The leader’s characteristics are of great importance when it comes to managing creative people. Especially important are technical expertise and creative problem solving skills. Leaders of creative organizations cannot simply retreat into secure isolation of administration, but must instead play an active part in acquiring information (Hurley 2003). Mumford et al. (2002) explains the importance of leader knowledge with the fact that creative people need to feel professional identification with their leader.

In this setting we will emphasise Mumford’s second explanation, a cognitive one. “Leaders must evaluate the ideas of creative people. Given the ill defined nature of creative work and the novelty evident in all creative problem solutions, it may be difficult, if not impossible, to evaluate ideas and provide feedback to followers or, for that matter, other managers, when leaders lack expertise and creative problem solving skills” (Mumford et al., 2002). Styhre and Sundgren (2005) has a similar explanation; “it is management that decide what is creative or not, make a decision about “how much creativity” they believe satisfies the need for the organization to renew its products or service portfolio”. It might be simpler to evaluate other people’s ideas because one idea might be close to other things a person can think of. This might lead to the misconception that the new idea is unoriginal, even if that is not true. A leader has the possibility to look at the idea from the outside. Research confirms that people identify original and popular ideas more often when they assess other people’s ideas “The highest percentage of correct identifications was for interpersonal evaluations” (Runco & Smith, 1992). Charles and Runco (2000-2001) suggests that the ability to evaluate other

people's ideas can develop earlier than the skills needed to objectively evaluate ones own ideas.

Some research has been conducted in the field of evaluation of ideas. Runco and Basadur (1993) found that enhancing creativity through training had a significant impact on the evaluative accuracy of the managers. In another paper, Runco and Smith (1992) found that there was a significant correlation between intrapersonal evaluative accuracy and divergent thinking. Charles and Runco (2000-2001) conducted a similar research on 3rd, 4th and 5th grades. In this instant evaluative scores were not related to divergent thinking scores. Farris (1972) found that the more creative individuals were more likely to communicate with leaders “when seeking evaluative feedback about project work and its implication and when initially defining, or constructing a problem. (in Mumford et al.2002).

The importance of the leader's evaluative skill is further emphasized when you look at other parts of their job. An important area of responsibility for most leaders is choosing and evaluating projects. “Project selection not only specifies the work to be done, it also develops the competencies needed for future work and establishes the framework around which people will interact.” (Mumford, 2002). The leader's ability to select projects can act as a structuring element, and help the idea generation later on. It is also important for the communication and development of expertise within the group. They are also often responsible for politics, namely selling the idea to the rest of the organization. This entails an impetus on sense making activities toward employees as well as other departments, managers etc. Being a leader, you also need to have a lot of knowledge about the organizational context. This is an important factor when assessing which ideas to pursuit and not to pursuit. In addition, leaders can help avoid premature rejection of viable ideas (Basadur & Finkbeiner, 1985). This attitude can be offset with training, exposure to creative efforts and with the leader's persuasive skills. The leader should in this sense encourage openness to new approaches.

In conclusion, we see that leadership and evaluation is closely connected given the difficulty employees can have when trying to judge their own ideas and projects. The leader is therefore often responsible for the final choice of which ideas to pursue, preferably interacting with the employee. Most leaders of creative ventures spend a substantial portion of their time evaluating ideas and choosing projects. This gives them potentially valuable experience with

the evaluation of creative ideas, and tells us how important it is that leaders are good at the identification of viable ideas.

7 Measurement

In the previous section we focused on general literature about creativity and evaluation. This general theory serves as the background of our paper, and provides a clearer picture of the setting in which our study is a part of. Evaluation of creative ideas is the theme of this paper. There is not yet much research on this, and consequently it is difficult to show relationships between the different elements of creativity and evaluation. Nevertheless, in the last section we tried to provide a short overview of this research or covered the literature more broadly to get a more explorative view of the subject.

7.1 Measuring creativity

Now we move on to a new section of the paper, a section related to measurement of creativity and evaluation. This is also presented in general terms, but it additionally explains some of the problems we had to consider and choices we had to make when performing our research. As Runco and Smith (1992:13) mentions “it would be highly unrealistic to think that evaluative skill is an isolated skill. Evaluative skill is just one of the skills (and attitudes) necessary for creativity”. We therefore found it imperative to cover some subjects connected to the measurement of creativity, focusing on the elements we want to assess in our own research, namely divergent thinking, attitudes and evaluative accuracy. In addition to these areas we will also measure some demographic elements.

We want to assess creativity, previously defined as “Creativity, from this point of view, is a process extended in time and characterized by originality, adaptiveness, and realization” (MacKinnon, 1962: 458). There are a few challenges when trying to operationalize creativity. Creativity is a multifaceted activity and one has to include areas such as cognitive activities, personality factors and critical thinking when assessing it (Feldhusen & Goh, 1995). The complexity of the phenomenon has also led to a disagreement on what to include in the definition of creativity, and the definitions can become comprehensive and difficult to operationalize. This has led to the existence of hundreds of creativity tests, most of them only

measuring a fraction of the actual content of creativity. Considering this fact, one should use a combination of different approaches to get a more holistic view of the concept.

The different perspectives to creativity, like the structure that divides creativity research into press, product, person and process (Rhodes 1961/1987), and disciplinary emphasis (behavioral, cognitive, biology etc.) generally use different measures to assess creativity. To take an example, focus on the creative person implies that you assess the individual differences in certain traits and people's capacity to engage in some cognitive processes. This is normally done by using personality inventories like the Adjective Check List, or tests of cognitive capacities like the Remote Associates Test (Mednick, 1962). The creative product approach focuses on the productivity of eminent individuals. The focus on productivity has the advantage of being objective; the products viewed are unquestionably original and useful. "The problem with the approach is that it often informs us only about productivity and not about creativity" (Runco, 2004). The focus on eminent individuals also limits generalizations to the rest of the population.

One should also bear in mind that "measuring creativity in isolation from other psychological and contextual variables is problematic" (Kerr & Gagliardi, 2003: 160) and that the use of multiple measures will give you a more accurate result. Dacey (1989) suggests the use of different assessment approaches, such as test-oriented (e.g DT-tests or remote associate tests) and non-test approaches that are personality (e.g personality inventories, demographic questions) or product oriented (e.g Creative Product Analysis Matrix). Unfortunately, using a variety of measures entails that each respondent will use a lot of time filling out questionnaires, limiting the number of respondents willing to participate. In the next section a few different areas of research will be presented, along with the tests within the different areas. Advantages and limitations to each method will also be briefly discussed.

7.1.1 Measuring divergent thinking

The wordreference dictionary (2006) defines divergent thinking as "out-of-the-box thinking-thinking that moves away in diverging directions so as to involve a variety of aspects and which sometimes lead to novel ideas and solutions; associated with creativity" The last point is of importance. Divergent thinking is associated with, rather than the same as creativity.

Guilford (1968) talks of divergent production as “producing a number of different ideas in response to certain given information” (Guilford, 1968). Tests based on divergent production are widely used to measure creative potential. It is important to use these test with a bit of caution, as “Divergent thinking is not synonymous with creative thinking, but it does reflect the ability to generate ideas and thus may play a central role.” (Charles and Runco, 2000-2001: 418). DT-tests have also been criticized for not being able to predict future creative behavior. Despite these facts, extensive research has been conducted looking at the divergent thinking tests, especially the Torrance Test of Creative Thinking, and the results have been mostly supporting. This is further enhanced if you look at the appropriate limitations of the method and use it in combination with other measures. Given the relative importance of DT-tests, we will consider these in a bit more detail

The Guilford battery

Guilford created a test based on his Structure of the Intellect model (SI) (Guilford 1968). It consisted of ten different tests. These tests are divergent production of: 1) semantic units, 2) semantic classes, 3) semantic relations, 4) semantic systems, 5) semantic implications, 6) figural units 7) figural classes 8) figural systems 8) figural transformations and 10) figural implications. Half of the tests are verbal (semantic), and the other half is nonverbal (figural). Even do the test has undergone widespread research, it still lacks the validity and reliability of the Torrance tests (Kerr & Gagliardi, 2003).

The test is normally scored on *fluency* which means the number of ideas given and *originality*. Guilford’s rationale for the emphasis on fluency was a belief that the speed of idea generation tells us something about the individual’s creative potential. All other things being the same, a person who comes up with more ideas will probably be more creative. Simonton (2004) argued that high speed would lead to a larger pool of ideas, and therefore contribute to the production of more original ideas. Mumford also acknowledges the importance of speed, but he suggests “that the study of speed should be tied to specific processes, or key mental operations, involved in peoples’ creative problem-solving efforts” (Mumford, 2000-2001)

The Torrance Test of Creative Thinking

The Torrance Test of Creative Thinking (TTCT) is the most used and the most researched test to measure creative potential. TTCT also contains both verbal and nonverbal tasks. The test is

scored on fluency, originality and flexibility (number of categories of ideas). The nonverbal version is also scored on elaboration.

Research shows that the Torrance Test of Creative Thinking measures something that is “distinct from academic aptitude/ achievement” and that “divergent thinking is multidimensional” (Clapham, 2004). The verbal and the figural TTCT are only moderately intercorrelated and principal components analysis confirms that verbal and figural divergent thinking are two separate factors. The TTCT demonstrate moderate to high test- retest reliability, but as for so many other tests within the area of creativity, the predictive validity is somewhat weak. This is something that can be said also for tests within the area of intelligence. Research has showed that correlations between TTCT-scores and accomplishments in adulthood sometimes are higher than that of intelligence in predicting adult achievement. The tests ability to assess practical performance in areas requiring a great deal of technical knowledge has also been questioned (Hsiao & Liang, 2003).

Wallach and Kogan Creativity Tests

Wallach and Kogan (1965) based their divergent thinking-tests on their study of the effects of testing conditions. They allowed for a more playful approach to the assessment of creative potential. The Wallach and Kogan Creativity Tests also consist of both figural and verbal assignments. The tests has the advantage of being well regarded among creativity researchers in addition to consistent results indicating good reliability and validity (Cheng et al., 2004)

Scoring divergent thinking tests

The divergent thinking tasks are normally scored on factors such as fluency, originality and flexibility. *Fluency* is the most widely used factor for scoring DT-tasks. It is a measure of the number of ideas a respondent gives. Research suggests that ideational fluency is a relevant factor to consider in that “the more solutions considered, the more likely some will be creative” (Amabile & Collins, 2004). There is more agreement that *originality* is a facet of creativity. Almost all of the definitions of creativity include some word for original. An idea/ product need to be for example uncommon/ unusual, unique or new to the world. The operational definition is normally based on statistical infrequency within a population. This is the objective score, but subjective scores are sometimes used as well. Expert judges could be used to assess originality, subjectively. Research on the use of judges shows cultural

differences in evaluation in that there was a greater consensus among Chinese than American judges of artwork, and that American judges used stricter standard, Sternberg (2001).

Flexibility is a measure of the number of categories used. It is not used as often as fluency and originality because of problems with subjectivity in categorization and the fact that flexibility in some instances has correlated strongly with fluency. Runco (1991) emphasizes the importance of considering flexibility when you measure ideation “it increases the universe of possible ideational classes, and thereby increases the probability of finding a divergent or truly creative idea”. In addition to these measures divergent thinking tests are sometimes scored on *appropriateness* as well. This is normally done by the use of expert judges. If the authors score the data themselves you risk that bias can affect the outcome. Depending on task, domain experts might be the best choice.

7.1.1.1 Testing conditions

To what degree a DT-task should be related to a person’s job or something else familiar is another important discussion. Mednick (1968) held that “The greater the number of instances in which an individual has solved problems with given materials in a certain matter, the less is the likelihood of his attaining a creative solution using these materials”. Figural tasks seem to have the advantage of being more unfamiliar to the subjects, and might feel a bit more game-like. In the same way, if a job-related task is given, the respondents could be looking for a right answer, or use previously successful tactics in stead of serendipity, trial and error or on the spot associations. Runco, Dow and Smith (2006) found that a person’s result on a divergent thinking task can be significantly related to the knowledge a person has within the domain of the task. To avoid bias it is therefore important that all respondents have got approximately the same amount of knowledge on the subject of the test. If this is not possible, unfamiliar tasks should be given or tasks that are less realistic.

One should also consider the effect of time constraints on respondents. It has been suggested that the more original/ creative ideas often comes later in a divergent thinking session. Recent research showed that time constraints could have less of an effect on divergent thinking results than previously anticipated. “Overall, the analyses provide surprisingly little evidence

of a relation between time on task and either ideational behavior or DT” (Plucker, Runco & Lim, 2006:55).

7.1.1.2 Research on the DT-tests

The TTCT is the most widely researched DT-test, but the results have been somewhat varying. It is especially within the area of predictive validity the tests have found little support. Parker (1980) found no reliable prediction of later nonacademic achievement and Kanter (1984) found that the TTCT was ineffective when it came to the identification of creative artists and scientists (from Feldhusen & Goh, 1995). It has also been claimed that divergent thinking tests suffer from experiential bias (Runco, Dow & Smith (2006).

The weak predictive validity of the DT-tests could be a result of poor methodology and the reliance on quantitative outcome measures, like fluency. Torrence (1978) suggests that you should use fluency, originality and flexibility, using only one of the variables could lead you to underestimate or overestimate creative potential (from Runco, 1991). This is further enhanced by statement such as “one index alone does not convey all of the information contained in divergent thinking test scores” (Runco, 1991). Lacking discriminant validity among the attributes has led to attempts to find scoring methods based on a more holistic measure. Proposed methods entail the use of external experts. This could further enhance the ecological validity, but suffers from problems concerning subjective measures. Tests of creativity have been criticized for exactly the lack of objectivity in its measures. This has been solved by looking at the product rather than the creative process. Methods such as counting patents have been used, but the products patented need not be creative in the sense valuable or appropriate. In recent years, advances have been made when it comes to statistical analysis of the results of divergent thinking tests. This has opened up for the use of DT-tests to assess creative potential in an objective manner.

It is important to keep in mind that divergent thinking tests are more likely to assess creative potential rather than the actual use of this potential. “Divergent thinking is just one component of creativity” (Runco, 1991). As we have seen, many factors interplay to predict creative outcome. Guilford (1968), mentions that the use of both divergent thinking and convergent production is essential for creativity. Other examples are the connection to knowledge,

context, environmental variables, attitude and motivation. One also has to consider the instructions given to respondents when divergent thinking tests are administered. Research shows that instructions to come up with creative (novel and worthwhile) uses in stead of as many ideas as possible can have positive effects on the number of creative ideas produced (Harrington, 1975). If you take all of these things into account, divergent thinking tests can give you valuable information about the potential for creative thinking.

To get a better understanding of how an individual can go from potential to creative productivity we should use DT-tests in combination with attitude, interest and personality questionnaires, since “A valid assessment procedure should consider both cognitive and personality components” (Kerr & Gagliardi, 2003: 168). Feldhusen and Goh (1995) conclude that real life creativity is complex and that “no single test will measure it”.

7.2 Attitude measures

As mentioned, attitude has not been researched excessively in the context of creativity. None the less, Basadur and Hausdorf (1995) found that “employee attitudes toward creativity can indicate their potential for behaving in a creative manner”. In addition, “attitudes and personality, like divergent thinking, are observable and measurable” (Kerr & Gagliardi, 2003). Some of these inventories also have an advantage over the DT-tests because relatively easy to administer and score.

Basadur has focused on the two ideation attitudes of preference for active divergence and tendency for premature convergence. Studies have found the measures of these attitudes to be reliable and valid (Basadur & Finkbeiner, 1985).

7.3 Measuring different aspect of evaluation

The evaluative aspects of creativity have been measured in different ways. Some have used judges and a more subjective way to assess evaluation while others have used a more objective method. Especially within the area of evaluative accuracy work has been done to

provide a method of measurement that is reliable and valid. The focus here is on the identification of ideas that are original (measured by the objective standard statistical infrequency within a population) and popular (statistically common). We will elaborate on the different types of assessments under the section on methodology.

8 Research problem, model and hypotheses

By now, we have presented theory we find relevant to our research. First we presented general theory about creativity and then we tried to connect it to the field we were most interested in, namely evaluation. The last section of the theory presentation provided a short overview of research methods available for analyzing both evaluation and our predictor variables. The rest of the paper will concentrate on our research. While going through the literature we found some aspects of the field where there were relatively little research. The next chapters will explain the focus of our research; present methods used and provide results and discussions about our findings.

8.1 Gap in the literature

Quite a few researchers have identified evaluation as an important subject of research. Charles and Runco (2003: 418) points to the fact that although divergent thinking is important, “divergence alone will not lead to much”. Purely divergent ideas can be quite bizarre. If they are being produced to find a solution to some problem, they might very well be irrelevant”.

Although evaluation has been identified as an important part of coming up with original and appropriate ideas or products, it has been an underrated subject of research. To take an example, West et al. (2004) suggests that evaluation of ideas has not been as prioritized as it should be, given the relative importance. They feel that there is a lack of a proper operationalization of the degree of innovativeness. This confirms the tendency we have seen throughout the literature review. Researchers generally acknowledge the importance of the subject and an evaluative component is included in the different models of creativity. Still, we

struggled to find a comprehensive body of research looking into factors that can influence evaluative ability.

In addition, Mumford (2002) identified evaluation ideas as one of the most important aspects of creative leadership. Still few studies have been conducted within the area. Runco and Basadur (1993) looked at a training program for 35 managers. They identified improvements in intrapersonal evaluative accuracy in response to the training. In our study we wanted to build on this research by including some respondents with leadership experience and some that had no such experience. In this way we could see if the two groups differ in the way they evaluate ideas. The effect of leadership experience on evaluative accuracy has not previously been considered in the research literature. We will focus on the interpersonal factors instead of the intrapersonal, considering the importance of the leader's ability to evaluate the ideas of subordinates and co-workers.

The review of research within the field of evaluation shows that quite a few of the studies have been conducted with students or children as respondents. Our focus will therefore be on people that are active in business, but differ in the type of job they are currently in, educational level, job experience and age. The main focus will be on the possible link between experience and evaluative accuracy. Suggested relationships between the two factors have been mentioned in the psychoeconomic approach to creativity, but we did not find any research on the subject. It is an interesting area because knowledge might be a requisite for good judgments, but it can also lead to a degree of fixedness.

Finally, only a few researchers have covered the area of creativity and attitudes. We want to take a closer look at that relationship between attitudes and evaluative accuracy in the creative context. Available research on both attitudes and leadership in association with evaluation tend to have been conducted in a training setting, where the aim is to observe attitudes and leaders' creative and evaluative abilities after the training program. Our intention was to perform similar tests, but in a non-training context.

8.2 Research problem

The starting point for our research is thus the gap in the literature regarding the effect of leadership and work experience on evaluation of ideas. Leadership experience and working experience were grouped, and together with education they constitute job- and educational factors that may influence evaluative skills. In addition, we wanted to take a closer look at the effects of attitude and creative ability on evaluation, which were grouped together in personal factors. Previous research has primarily concentrated on pupils or students and teachers. Our approach was a bit different, in that it provides knowledge about working professionals and leaders. We want to examine different characteristics of the participants and further to explore if some of the differences explain evaluative accuracy. This leads us to the following research question:

How do personal and job factors predict evaluative accuracy?

The purpose of this paper is to explore underlying factors that affect our dependent variables evaluative accuracy of popular and original ideas. The independent/ predictor variables are divided into two groups. The first one, personal factors include creative ability and attitudes. We could have operated with a bigger range of variables here, including factors such as intelligence, personality and age, but chose to limit ourselves for a number of reasons. As mentioned, earlier research, Runco and Smith (1992) found that measures of intelligence and critical thinking did not correlate with evaluative accuracy. Adding too many factors into a regression will lead to methodological problems, especially when the number of respondents is few, intelligence was thus eliminated. The administration of personality and motivational inventories was unfortunately not possible because of time constraints. Age is included as a moderator variable, to see if it affects the relationship between working experience and evaluative accuracy, hypothesizing that age is unrelated to evaluative accuracy.

We chose to include attitudes because it seemed to be somewhat understudied and of great interest to us. It also seemed likely that the two attitudes would affect evaluative accuracy. Creative potential was included because it was closely related to our field of interest, and had lead to interesting findings in a non business setting.

The second group of predictor variables, job factors included variables that were closely connected to the line of work the respondents were in. Again we were faced with the choice of a limited range of all possible factors. Reviewing the literature we decided that leadership experience would provide new insights to the field. In addition, we wanted to look at the related field of working experience and educational background as part of our research.

8.3 Research model

We have developed a model that illustrates the relationships we want to explore. The independent variables are divided into two groups, one consisting of personal factors and another one consisting of job factors. Previous research has identified two attitudes that influence the ability to accurately classify ideas. A person with the attitude preference for ideation (active divergence) would prefer novel ideas and solutions, take multiple perspectives in problem solving and look for continuous improvements, while a person with the attitude preferences for premature closure (premature convergence) would look for flaws in ideas, eliminate seemingly bad ideas from consideration, dislike mistakes and optimize on one solution (Basadur, Graen & Scandura, 1986). By creative potential we think of fluency, flexibility and originality scores as described earlier in this paper. The job category consists of working experience, leadership experience and educational background.

Our model indicates that all of the factors influence evaluative accuracy of the evaluator. In this paper we will include two dependent variables, namely the correct identification of popular and original ideas. Popular ideas are ideas that are statistically common (given by many of the respondents), while original ideas are ideas that are statistically rare (given by only one or two of our respondents). The two are measured objectively, by looking at the number of ideas a person correctly identified as original and popular.

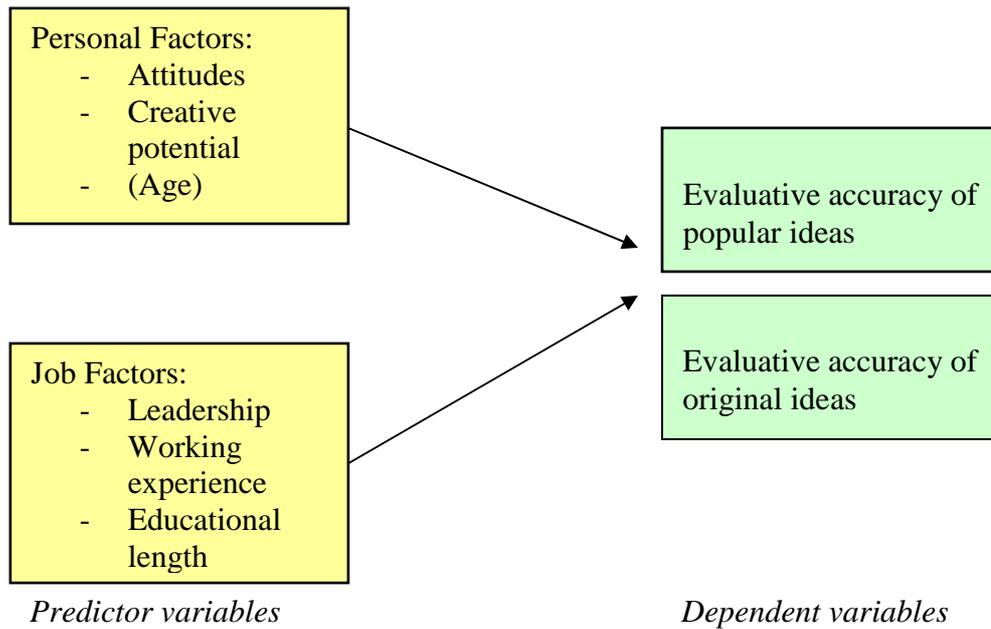


Figure 2: Research model

8.4 Hypotheses

To answer our research problem we have developed a set of hypotheses based on the model presented above. The hypotheses serve as means to assess the relationships between the variables. Since creative potential and evaluative accuracy is an area that has not been explored in that many research papers, the hypotheses has to be deduced from a combination of the research that has already been conducted and research/ theories from all the areas we have covered in the literature review.

Personal factors

The first hypothesis concerns the relationship between attitudes and evaluative accuracy. It is likely that persons with different attitudes and preferences towards creativity differ in their evaluation of ideas. Only a few studies have examined this relationship, and most of them report results only on one of the relevant attitudes at a time. Earlier research on the relationship between ideational preference and popular evaluative score has shown a significant and negative relationship (Runco & Smith, 1992). After creativity training program Runco and Basadur (1993) also found that evaluative skill was negatively related to preference for active divergence. This leads to the hypothesis:

H1) The attitude “preference for ideation” will be negatively correlated with accurate evaluation of popular ideas in a sample of business people.

H2) The attitude “preference for ideation” will be negatively correlated with accurate evaluation of original ideas in a sample of business people.

It has been quite difficult identifying research that provides evidence of a significant relationship between preference for premature closure and evaluative accuracy. Our next hypothesis is therefore based on the discussion from chapter 6.6 in this paper, about evaluation and attitudes. We stated that a person is unlikely to perform an activity he or she has no interest in, or has a negative attitude towards. Preference for premature closure has a negative tone to it, which indicates that persons with this attitude are likely to find flaws when evaluating. This may lead to cutting off ideas too soon, which in turn may affect the evaluative accuracy.

H3) The attitude “preference for premature closure” will be negatively correlated with accurate evaluation of popular ideas in a sample of business people.

H4) The attitude “preference for premature closure” will be negatively correlated with accurate evaluation of original ideas in a sample of business people.

Second we want to consider the relationship between creative potential and evaluative accuracy. Runco and Smith (1992) found a significant correlation between both intrapersonal and interpersonal evaluation and divergent thinking. Some differences in evaluation occurred; “Examinees were significantly more accurate when evaluating the uniqueness rather than the popularity of their own ideas, but significantly more accurate when evaluating the popularity rather than the uniqueness of ideas given by others.” Mumford (2002) provides an explanation for this. Although it is given in the context of leadership, it may be generalized to apply for the whole population: “Given the ill defined nature of creative work and the novelty evident in all creative problem solutions, it may be difficult, if not impossible, to evaluate ideas and provide feedback to followers or, for that matter, other managers, when leaders lack expertise and creative problem solving skills”.

On a more intuitive level one could also argue that when evaluating one rely on own ideas and compare ideas generated by others with own ideas. It is likely that a majority of the ideas evaluators will generate themselves are popular, and that they would recognize similar ideas and thus categorize them as popular. When evaluating ideas one often turns to oneself as point of reference. If the evaluator is likely to generate the same or similar ideas, then he or she realizes that it is likely that also others will come up with it. Hence, one compares the ideas evaluated with ideas one would suggest oneself. Because ideational fluency is described as the ability to generate several ideas, people who receive high scores on this factor have a broader basis for comparison when evaluating. The same process may take place when evaluating original ideas. If the ideas evaluated are not ideas the evaluator would come up with, then he or she may recognize the newness of the idea and consequently identify it as an original idea.

Based on the findings of Runco and Smith (1992) and on the reasoning above we suggest the two following hypotheses.

H5) Ideational fluency will be positively correlated with accurate evaluation of popular ideas in a sample of business people.

H6) Ideational fluency will be positively correlated with accurate evaluation of original ideas in a sample of business people.

Runco and Vega (1990) also found a positive relationship between divergent thinking scores and evaluative accuracy. Research shows that “two indices of ideational skill (originality and fluency) were significantly associated with the two correct-identification evaluative scores”, but it was the originality score that explained most of the variance. Our participants are judging ideas given by others, and despite findings indicating difficulty in identifying original ideas given by others, we rely on the findings in Runco and Vega.

Again, we can argue that the evaluators compare ideas evaluated with boundaries of their own minds. An evaluator that is likely to generate several original ideas to a problem may also be able to recognize originality in ideas given by others. Even more importantly, ideas beyond the evaluator’s idea generation are likely to be correctly identified as original.

H7) Ideational originality will be positively correlated with accurate evaluation of popular ideas in a sample of business people.

H8) Ideational originality will be positively correlated with accurate evaluation of original ideas in a sample of business people.

Job factors

We also wanted to look more directly at the relationship between work experience and evaluation. Kagel and Levin (1986) argue that “the process of improving judgement will occur naturally as individuals receive feedback of their past decisions” (from Bazerman, 2002). Runco and Vega (1990) found that parents with more children were more accurate in their evaluation of children’s ideas. It seems that the experience they gained through the upbringing of their children had a positive effect on their evaluative ability. Mumford (2002) also made the prediction that expertise was a prerequisite for evaluative ability “it may be difficult, if not impossible, to evaluate ideas when leaders lack expertise”.

As time passes employees get more experience in the workplace, one develops a better understanding of the business and ability to generate new ideas and decide which ideas are worth pursuing may increase. Time and effort spent on this may be looked at as investments. As suggested by psychoeconomic theory (Rubenson & Runco, 1995) there is a danger that a large investment in such experience is related to a degree of inflexibility. The fear of having to admit that the investment is outdated or irrelevant for performance may lead to a limited search for new solutions or blocking of information that is in great contrast to own experience and expertise. This could have great significance when we look at how experts evaluate creative ideas. An expert might have an incentive not to pursue a viable idea. Our prediction is that inflexibility, as described in psychoeconomic theory more than offset the increased possibilities expertise gives to make better judgments.

H9) Working experience will be negatively correlated with accurate evaluation of popular ideas in a sample of business people.

H10) Working experience will be negatively correlated with accurate evaluation of original ideas in a sample of business people.

The next job factor we want to consider is leadership experience. Managers of large organizations improved their evaluative skills after a three day training program (Runco & Basadur, 1990). This research does not tell us anything about differences in evaluative skills between leaders and non-leaders. By exploring our next hypothesis we would like to say something about this relationship. Often leaders of organizations are both older and more experienced than their employees. As opposed to employees much of the leaders' attention is directed at observing and evaluating others ideas. Psycoeconomic theory is consequently of less importance in this case. In addition leaders' jobs often involve more evaluation and decision making. According to Robbins (2005) "average" leaders spend 32% of their time on traditional management characterized by decision making, planning and controlling. Following a learning-by-doing perspective, this may influence leaders' ability to more accurately identify popular and original ideas. This leads us to the following hypothesis:

H11) Leadership experience will be positively correlated with accurate evaluation of popular ideas in a sample of business people.

H12) Leadership experience will be positively correlated with accurate evaluation of original ideas in a sample of business people.

The final set of hypotheses concern education. This too, is poorly examined in the context of creativity and evaluative skills. Runco and Smith (1992) among others, has performed research among students, but this implies that all of the participants were still in school, and at the same level of education. These findings will not be helpful in the shaping of our hypotheses, because we want to identify if there are any differences in evaluative accuracy between those with longer educations and those with only one or a few years of education.

Instead we once more turn to more intuitive explanations. Along with education comes expertise and knowledge. The more years of education, the more one learns academically. Often years of education also add to ones stature and alertness. Education provides examples, ideas and philosophies developed by others, and consequently educated people are more likely to know which ideas are corresponding to the more traditional line of thinking, and which ideas have novel elements attached to it. With education one is also forced to asking questions and to do some critical thinking. This may also lead to a better understanding of

what it takes for ideas to be common or rare. Based on this we proposed the following hypotheses:

H13) Educational length will be positively correlated with accurate evaluation of popular ideas in a sample of business people.

H14) Educational length will be positively correlated with accurate evaluation of original ideas in a sample of business people.

9 Methodology

This section provides a description of our approach to answer the hypotheses. It describes our method for collecting data and which methods we used to analyze it.

The objective of our research was to better understand the evaluative skills of corporate employees. To be able to check our hypotheses, the participants were measured on demographical variables, attitudes, creativity and evaluative skills. We were allowed to administer our questionnaires at an evening course at the Norwegian school of Business and Administration Management. This allowed us a wide range of different occupations and educational backgrounds with age ranging from 19 till 60. In addition we got a chance to conduct the research on employees in Bergen City Council/ the Municipality of Bergen. For the students of the evening courses we first met them once to conduct a typical creativity test, the divergent thinking test, and to get information about the participants' backgrounds. Then, after evaluating the data we had gathered, we met them once more and asked them to perform another test, to identify their evaluative skills. The same procedure was used in the Municipality of Bergen.

9.1.1 Participants/ subjects

The participants (N=70) were employees in both the public and private sector in Bergen. Participants from the evening courses varied the most when it came to age, educational background and working experience and in this group we found employees in both the private

and the public sector. In the Municipality of Bergen we also had participants with different backgrounds and that were employed in different departments, with different types of positions. Taken together, 79.4 percent of our participants were working in the public sector. The participants varied in their level of responsibility and the leader activities they performed in their work. The male-female ratio was 28.8 percent against 71.2 percent. The group's grade point average from high school was 4.4. This is somewhat higher than the population average that is closer to 3. A few of the respondents had only a high school diploma, but on average the group had 4 years of higher education and most of the respondents had a master's degree. 43.8 percent of the respondents had leadership experience in some degree, and 28.8 percent had a leadership title. The average respondent had eleven years of work experience and there was a standard deviation of 8.

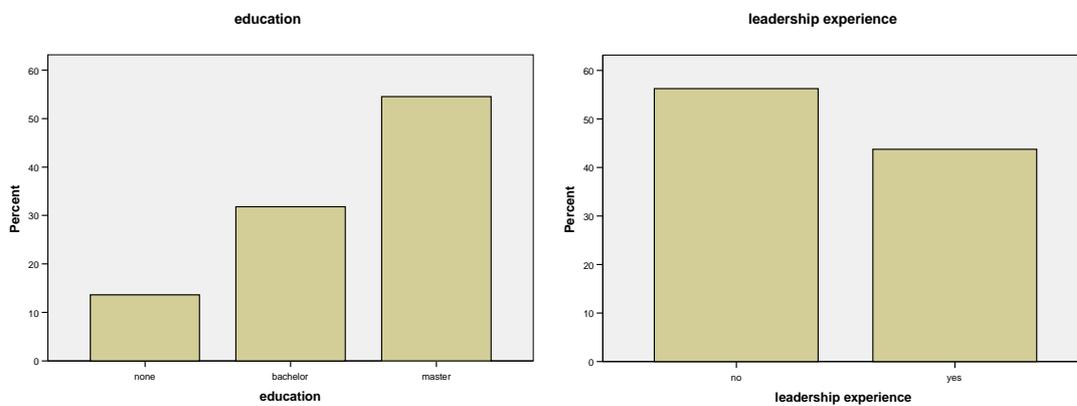


Figure 3: Demographics

9.1.2 Instruments

As we saw in the section on measurements one should consider the use of multiple measures to assess creativity. In our study we had to balance the need for data on several variables against the possibility of boredom and a low participation rate. We knew that if the time it took to complete the questionnaires was too long it would limit our chance to use respondent from the evening courses at NHH. Therefore we chose to use three divergent thinking tasks, with a five minute time limit on each to test. Two types of verbal Wallach-Kogan Creativity tests were used namely instances and uses. The tasks were as follows: 1. Name all the strong things you can think of and 2. Tell me all the different ways you can use a brick. In addition, we chose a problem divergent thinking. This was a bit closer to real life: 3. Name all the problems you can think of that we did not have 50 years ago. In the choice of DT-task, we

looked at the trade-off situation between advantages/ disadvantages with realistic or more playful assignments. The more “realistic tasks might be more constrained than the standard tasks, such as Instances and Uses” (Runco, 1991-1). If you are to use realistic tasks, it would be beneficiary to administer some standard tasks first, to acquaint the respondents with the use of more unusual responses. Given the limited amount of time we had available for the DT-tasks this was unfeasible. Also, the group varied in the types of professions, the industry they worked in and job assignments, making it difficult to find realistic tasks that were equally familiar to them all. The use of realistic tasks could therefore lead to experiential bias (Runco, Dow & Smith, 2006). We wanted to focus on how work and leadership experience influenced general evaluative accuracy, not only within a domain. All of these facts lead to the use of two standardized fairly playful DT-tasks, and one problems-task that gave the respondents more of a chance to use their work experience no matter what job assignments they had.

To score the divergent thinking tests we made a lexicon of all the ideas given and the number of distinct ideas was counted to make up the ideational fluency-score for each person on each task. To assess originality we scored the ideas in response to unusualness and uniqueness. They were given two points for ideas in which they were alone on and one point for ideas that they shared with another respondent. Finally, all ideas were put into different categories, and based on the number of categories one person had ideas in, we found their ideational flexibility. Because of the subjectivity involved when scoring flexibility each of us categorized the first 20 participant’s ideas independently. We agreed on close to 90% of the categorization for the different tasks. An average score was calculated on each task when it came to fluency, originality and flexibility. All the scores were then weighted according to the average score on each task, giving the respondent a score of one on ideational fluency if they gave the average number of ideas during the five minutes. A grand total was calculated by adding up the scores from all the tests.

The Basadur 14-item Ideation-Evaluation Preference Scale (Basadur & Finkbeiner, 1985) was used to assess attitudes related to creativity. The procedure of this test is that the participants give responses to a number of statements, rating them on a five-point Likert scale from totally disagree to totally agree. Based on this we were to identify two attitudes related to creativity and evaluation. These were preference for active divergence and preference for premature convergence. To make sure there were no problems with the language we translated the questionnaire into Norwegian. We also checked if the meaning of the questions remained the

same by having it translated back to English. Because of the possibility for detrimental effects of expected evaluation on intrinsic motivation, the respondents were not told about the evaluative part of the study at this stage. The divergent thinking tasks were also presented more as a game than as a test, insuring the respondents that there were no wrong answers and that there would be no grading. Subject numbers were used throughout the study to assure anonymity. They were also told to work alone on all the tasks and questionnaires.

On the basis of the ideational originality scores, an evaluation form was composed. We randomly picked 8 ideas from the original ideas (mentioned by less than 3 percent), 8 intermediately common ideas (mentioned by 7-13 percent) and 8 popular ideas (mentioned by more than 20 percent) from each of the divergent thinking tasks. Random number table was used to decide on the order the ideas were presented in. The respondents were instructed to rate the ideas from 1 to 7, giving a low score (1 or 2) to the ideas they did not find original, the middle numbers (3, 4 or 5) to the ideas that they found to be somewhat original and a high score (6 or 7) to the ideas they found original. An evaluative scale consisting of all three categories would in all probability wind up with a low reliability score because there are three correct options for the intermediately common ideas, but only two for popular and original ideas. For this paper we will concentrate on the common and original ideas given these two categories relevance to creativity. The participants were told to use the entire scale and to answer individually. The evaluation form was scored objectively by how many ideas that was correctly identified among the highly original ideas (unique ideas evaluation score) and among the popular ideas (normal ideas evaluation score). Correctly identified ideas among the intermediately common ideas were also recognized.

All the above questionnaires were assessed for internal consistency. Analyses were conducted for the different evaluative scores, for the two attitude scales and for the divergent thinking scales. Reliability was confirmed by a Cronbach's Alpha coefficient of .739 on the divergent thinking fluency-scale (Cronbach, 1951). Cronbach's Alpha for ideational originality was only .390 and ideational flexibility .477. The low Cronbach Alpha scores for originality and flexibility will be taken into account in the result section below. For the total evaluation scale the reported Cronbach's Alpha was .581 when evaluation of unique and popular/normal ideas was included (N=57). Intermediately common-items showed the highest item-total correlation with a Cronbach's Alpha of .683, but as expected the intermediately common scale decreased the reliability of the total evaluation scale leading to an Alpha of only .229. We therefore

chose to eliminate the intermediately common items from the total evaluation scale. Runco and Basadur (1990) have also used an evaluation scale consisting of rare/ original (statistically infrequent) and common/ popular (statistically frequent) ideas. The internal consistency of the evaluation scale is further confirmed by Runco and Basadur (1993:168) in that “the evaluative measure has been used previously with parents, teachers, college students, and children, and seems to be reliable”. Attitudes were divided into two scales, one for preference for ideation and one for preference for premature closure. Cronbach’s Alpha was reported of .533 and .796. It is possible that the weak result regarding the preference for ideation scale can be explained by the low number of items about this particular attitude in the test. According to Runco and Smith (1992) the preference for ideation showed internal consistency in their research with a Cronbach’s Alpha of .65. The different inventories will be displayed in the appendix.

9.1.3 Procedure

First, all our participants answered some general questions about demographical variables such as age, educational background, working experience etc. These questions were all presented to them in the format showed in the appendix, number 4). Second, the participants were asked to fill in the Basadur Ideation-Evaluation Preference Scale. At the same session the participants were given a standard creativity test. They got three divergent thinking tasks in the above mentioned order and were given five minutes on each of them to come up with as many ideas as possible. The participation in the study was optional, but no-one chose not to take part in it.

The divergent thinking tests were scored for fluency, originality and flexibility. Based on the results of these tests we identified creative ideas, average ideas and non-creative ideas. Ideas within the different categories were randomly chosen to make out the evaluation form. This was administered the second time we met. The participants were instructed to grade each idea according to how creative they thought it was. This enabled us to identify the participants’ abilities to recognize original ideas by calculating how many ideas they rated accurately in each category.

9.1.4 Design and analyses

Our research problem is a causal one, giving us the choice between a number of possible designs. Cross-sectional or correlational research design is often used because of the simplicity and the fact that it requires less resource than for example time series designs. Because of the limited amount of time and money associated with a master's thesis we chose a simple cross-sectional design. This entail that most of the data are collected at one point in time. This again necessitates a close look at prior research and theory to assess the cause and effect relationship.

The group of respondents have been chosen so that we would have a higher fraction of leaders and people with leadership experience than we would if we were looking at the population as a whole. In addition to our independent variables, we gathered data on age, so as to control for potential effect of this factor on the other independent variables. This is not included in our hypotheses, but will be included in the analyses.

10 Results

This chapter provides the results of our analysis as well as some rationale for the choice of statistical technique.

10.1 Statistical technique and checking for assumptions

A one way analysis of variance (Anova) was used to find out if the respondents from NHH and the Municipal of Bergen differed in their evaluative accuracy. No significant difference between the groups was found $F(1, 58) = .000, p=.994$, with a group mean of .3315 at NHH and .3318 in the Municipal of Bergen, leading to a very small mean difference (.0003). The Levene test of the assumption of equal variance shows that this assumption has not been violated, $p=.779$. We will therefore for the rest of the result section not separate the data collected at the Municipal of Bergen and NHH.

ANOVA

total evaluation, minus medium

	Sum of Squares	df	Mean Square	F	p (sig)
Between Groups	,000	1	,000	,000	,994
Within Groups	1,241	58	,021		
Total	1,241	59			

Table 1: Anova

Twelve of the respondents at the first session at NHH and the Muncipal of Bergen was not present when we came back to gather data on evaluative accuracy and one person came a bit late to the first session and did not have time to do the first divergent thinking task and fill out the demographic questions. That left us with an N of 57 when performing the multiple regression.

To test the hypotheses we used a standard multiple regression. Evaluation of popular and original ideas was used as dependent variable, attitudes, ideational fluency and originality, educational length, age, leadership and working experience was included in the analysis. Multiple regression permits us to test for spuriousness. Age was thus included, to check if it changed the relationship between the other independent variables and evaluation.

In total, 33% of the original ideas were correctly identified, while 35% of the popular ideas were correctly identified.

Throughout the study we have attempted to eliminate the number of possible predictive factors by looking at prior research. Factors that have been entirely unrelated to evaluation in earlier studies (such as grade point average) are thus eliminated. There are two important reasons for this. The first one is that gathering data on a high number of variables could possibly limit the number of respondents prepared to participate in the research. The second reason has to do with the possibility of inflating type one errors and of an increase in type 2 errors when multicollinearity becomes large. Cohen and Cohen (1983) concluded that “reducing the complexity of the investigation by minimizing the number of predictors is likely to result in more meaningful and comprehensible results” (from Grimm & Yarnold, 1995).

Multiple regression analyses assume that the dependent variable is interval or ratio-scaled, an assumption which is not violated in this case since our dependent variable, evaluation, can be reported on a ratio scale. The advantages of using regression are the greater sensitivity and power inherent in the use of parametric statistical analyses. Nunnally (1978) and Labowitz (1972) claim that the advantages might more than offset the disadvantages by using multiple regression even when the variables fall between ordinal and interval scales, as it often does when you measure factors such as attitudes.

“Tabachnick and Fidell (1996) provide a formula for calculating sample size requirements, taking into account the number of independent variables that you wish to use: $N > 50 + 8m$ (Where m = number of independent variables)” (Pallant, 2003). In our regression we operate with six independent variables, ideational preference, preference for premature closure, fluency, originality, working experience, leadership experience age and education. One should also consider the effect size when choosing how many respondents needed. The “weaker the assumed relationship, the more observations are needed to demonstrate statistical conclusion validity” (Ghauri & Grønhaug, 2002).

In general, correlations between the independent variables are not high enough to suggest problems with multicollinearity. This is further confirmed by tolerance values that are quite respectable, above .7. The exception is fluency and originality and age and working experience. As expected, correlation between these factors is present, originality/ fluency $r = .635$ and age/ job experience $r = .501$. Multicollinearity is quite common in the social sciences, considering the fact that non-experimental data are used (Lewis-Beck, 1980). Unfortunately it can lead to a number of problems, both technically and when it comes to the interpretation of the estimates. The technical problems occur if the intercorrelation is quite high. Looking at the literature, we have seen several suggestions to a maximum correlation between independent factors. Pallant (2003) mentions that the bivariate correlation should not exceed .9 whereas Tabachnick and Fidell (1996) suggest a bivariate correlation of .7 as a limit. Grimm and Yarnold (1995) concludes that “most investigators would probably agree that correlations of $r > .8$ between predictors should be considered very problematic”. In our case, with a bivariate correlation of .635, we therefore conclude that we do not violate the assumptions of multiple regression, in the form of ordinary least squares. Only in the case of perfect correlation between two independent variables, there will be no mathematical solution. If the correlation is not perfect, but still high like in our case, it would lead to larger standard errors

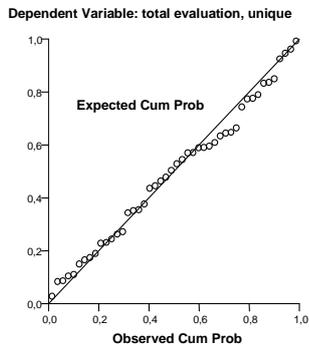
of the estimates. This will further lead to larger confidence intervals and the probability of getting a significant result decreases.

Practically, multicollinearity can lead to difficulty when interpreting the results. It is hard to say which of the predictor variables accounts for the variance. Multiple regression can not make the distinction between the variables when the intercorrelation is high, leading to a reliance on theoretical reasoning of the results.

Despite the problems with multicollinearity, we chose to include both the variables as is often recommended. Eliminating a variable that correlates with one of the other independent variables, will naturally lead to an increase or decrease in the estimate of prediction and will also influence the standard error of the estimate. Therefore “it may be that the best thing to do is simply to realize that multicollinearity is present and be aware of its consequences” (William, 2006). One suggestion is to include both of the factors in the original regression, but look at the effects of eliminating one of them. The interpretation effects of multicollinearity will be discussed in further detail when we look at the model as a whole and the relationship between divergent thinking/ creative potential and evaluative accuracy. The effect of adding age into the equation will be discussed at the end of the result-section.

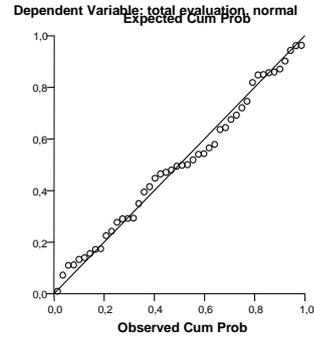
The Normal Probability Plot, as presented in the figures below, indicates no serious deviations from normality for the residuals. The Scatter Plot shows an acceptable distribution of the standardized residuals. No outliers (as defined by Tabachnick & Fidell, 1996) seem to be present in the Scatter Plot.

Normal P-P Plot of Regression Standardized Residual



Evaluation, original ideas

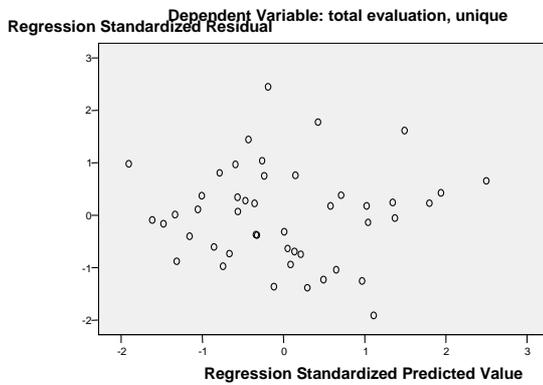
Normal P-P Plot of Regression Standardized Residual



Evaluation, normal/ popular ideas

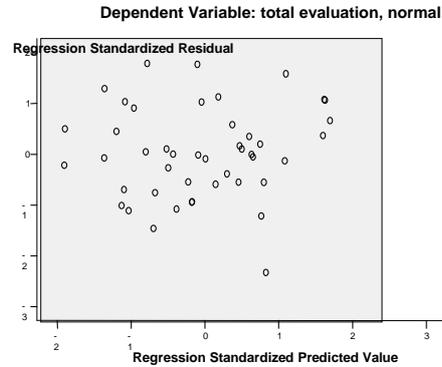
Figure 4: Normal P-plot of Regression Standard Residual

Scatterplot



Evaluation, unique/ unusual ideas

Scatterplot



Evaluation, normal/ popular ideas

Figure 5: Scatterplot

We chose to use the exclude cases listwise option when it came to missing values, leaving us with those respondents that had answered the questions for all variables included in the analyses.

Multiple regression with the evaluation of unique ideas as dependent variable reported an R square of .357 and an adjusted R Square of .218. The standard error of estimate is .14. The model reaches statistical significance at the 5 % level with $F(8, 37) = 2,565, p = .025$.

Model Summary, evaluation of unique ideas

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,597(a)	,357	,218	,14281	2,442

a Predictors: (Constant), Originality total, working experience, education, Preference for ideation, leadership experience, Tendency for prem. and critical evaluation, age, Fluency total

b Dependent Variable: total evaluation, unique

Table 2: Regression Model summary, evaluation of unique ideas

The standard multiple regression with evaluation of normal/ popular ideas as the dependent variable had a sample multiple correlation coefficient of $R = .750$, representing the overall fit of the model in the current population. This provides an R^2 of .563, representing how much of the variance in evaluative accuracy of normal ideas that is accounted for using the model in the present sample. The adjusted R^2 is somewhat lower =.469. In this case the standard error of the estimate is .12. Anova shows that the multivariate model explains significantly more of the variance in the dependent variable than a model with none of these predictor variables $F(8, 37) = 5.961 p = .000$.

Model Summary, evaluation of normal ideas

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,750(a)	,563	,469	,11927	1,794

a Predictors: (Constant), Originality total, working experience, education, Preference for ideation, leadership experience, Tendency for prem. and critical evaluation, age, Fluency total

b Dependent Variable: total evaluation, normal

Table 3: Regression Model summary, evaluation of normal/ popular ideas

In any statistic test there is a trade off situation between the probability of type 1 and type 2 errors. Type 1 error represents the likelihood of rejecting the null hypothesis when it is, in fact, true. Type 2 error is the likelihood of keeping the null hypothesis when it is false. The chance of type 1 error is determined by the alpha-level for each hypothesis. In this case we will use an alpha-level of $p < .05^*$, which is the typically used. Five percent will then represent

the possibility of rejecting the H_0 when this is in fact true. We will also indicate when the $p < .01^{**}$ and $p < .001^{***}$.

10.2 Evaluating the predictor variables

Two standard multiple regressions were conducted to explore the relationship between the predictor variables and evaluative accuracy. Ideational fluency and originality, the two different attitudes (preference for premature closure and preference for ideation), leadership experience, working experience, age and education was included in the analysis as independent/ predictor variables. Evaluative accuracy of unusual and popular ideas was included as the dependent/ criterion variables.

Evaluative accuracy of popular/ normal ideas

Model	Unstandardized Coefficients		Standardized Coefficients	t	p (= Sig.)
	B	Std. Error			
(Constant)	1,272	,190		6,679	,000
education	,072	,026	,316	2,737	,009
age	,001	,002	,077	,589	,560
working experience	,000	,003	,008	,061	,952
leadership experience	-,104	,038	-,316	-2,714	,010
Preference for ideation	-,132	,034	-,467	-3,845	,000
Tendency for prem. and critical evaluation	-,133	,025	-,684	-5,286	,000
Fluency total	-,264	,093	-,491	-2,845	,007
Originality total	,048	,053	,137	,910	,369

a Dependent Variable: total evaluation, normal

Table 4: Regression, all independent variables, evaluation of normal/ popular ideas

Evaluative accuracy of unusual/ original ideas

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error			
(Constant)	,832	,228		3,648	,001
education	-,010	,031	-,044	-,311	,758
age	,002	,003	,124	,780	,441
working experience	-,001	,003	-,073	-,447	,658
leadership experience	,052	,046	,159	1,128	,267
Preference for ideation	-,007	,041	-,026	-,176	,861
Tendency for prem. and critical evaluation	-,119	,030	-,623	-3,965	,000
Fluency total	-,208	,111	-,392	-1,872	,069
Originality total	,013	,063	,038	,207	,837

a Dependent Variable: total evaluation, unique

Table 5: Regression, all independent variables, evaluation of original ideas

10.2.1 The relationship between attitudes and evaluative accuracy

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error	Beta		
Evaluation of popular ideas:					
Preference for ideation	-,132	,034	-,467	-3,845	,000
Tendency for prem. and critical evaluation	-,133	,025	-,684	-5,286	,000
Evaluation of original ideas:					
Preference for ideation	-,007	,041	-,026	-,176	,861
Tendency for prem. and critical evaluation	-,119	,030	-,623	-3,965	,000

Table 6: Regression, attitudes as independent variables, evaluation of original and popular ideas

H1) The attitude “preference for ideation” will be negatively correlated with accurate evaluation of popular ideas in a sample of business people.

A significant relationship was indicated ($p = .000$) between preference for ideation and evaluative accuracy of normal/ popular ideas. This means that we can reject the null hypotheses, that the corresponding population beta is equal to zero both at the five percentages and the one percentage level. In this case we found that preference for ideation is negatively correlated with evaluation, with a standardized beta coefficient of $-.467$ and unstandardized $B = -.132$ with the estimated standard error, $SE_b = .034$. The standard error is a measure of sampling error or “the average deviation of a sample estimate from the true value of the population parameter across all possible random samples of size N ” (Jaccard, Turissi & Wan, 1990).

The unstandardized coefficient reflects that the evaluative accuracy of popular ideas is going to change $-.132$ units with a one unit change in preference for ideation, holding all the other predictive variables included in the analysis constant. This measure will often be problematic when trying to determine the relative importance of each independent variable in determining evaluation. In some cases the measurement units are not comparable. Standardization would then be preferable. Standardization is done by converting the scores into standard deviation units from the mean. The standardized partial slope estimate (Beta) of $-.467$ indicates the average standard deviation change in evaluation (in this case the evaluation of popular ideas)

associated with a one standard deviation change in X. Again, the other independent variables are held constant. The standardized partial slope estimate allows for the comparison of the effect of preference for ideation with the effect of the other independent variables.

H2) The attitude “preference for ideation” will be negatively correlated with accurate evaluation of original ideas in a sample of business people.

The same was not found looking at the evaluative accuracy of original ideas, in this case the relationship was far from significant, with $p=.861$ and a standardized beta of $-.026$. $B= -.007$, $SE_b= .041$. A simple linear regression using preference for ideation and evaluation of original ideas provided a positive beta of $.22$.

H3) The attitude “preference for premature closure” will be negatively correlated with accurate evaluation of popular ideas in a sample of business people.

The variable that made the strongest unique contribution to explaining the variation in the dependent variable evaluative accuracy of popular ideas was the attitude preference for premature closure. In this case the standardized beta coefficient was $-.684$. Preference for premature closure was significantly related to evaluative accuracy ($p = .000$), accurate identification of ideas decreased as the impact of this attitude increased ($B=-.133$, $SE=.025$).

H4) The attitude “preference for premature closure” will be negatively correlated with accurate evaluation of original ideas in a sample of business people.

As hypothesised, preference for premature closure was also negatively correlated with the evaluative accuracy of original ideas (standardized beta of $-.623$, $p=.000$). The attitude explained the most of the variance in the evaluative accuracy also when it came to the identification of original ideas ($B=-.119$, $SE=.030$).

10.2.2 The relationship between creative potential and evaluative accuracy

The same multiple regressions were used to evaluate the hypotheses concerning the relationship between divergent thinking fluency/ originality and evaluation. As mentioned,

originality correlated positively with fluency $r = .635$. This is a factor that we have to consider in the interpretation of the results.

Model	Unstandardized Coefficients		Standardized Coefficients	T	p
	B	Std. Error	Beta		
Evaluation of popular ideas:					
Fluency total	-.264	.093	-.491	-2,845	.007
Originality total	.048	.053	.137	.910	.369
Evaluation of original ideas:					
Fluency total	-.208	.111	-.392	-1,872	.069
Originality total	.013	.063	.038	.207	.837

Table 7: Regression, divergent thinking as independent variable, evaluation of original and popular ideas

H5) Ideational fluency will be positively correlated with accurate evaluation of popular ideas in a sample of business people.

A significant relationship between fluency and evaluative accuracy of popular ideas was found. The two correlated negatively, standardized beta of $-.491$, meaning that a change of one standard unit of ideational fluency will result in a change of $-.491$ standard unit of evaluative accuracy of popular ideas. The relationship ($p < .01$) is thus of substantial magnitude. We found a significant increase in evaluative accuracy as ideational fluency decreased ($B = -.264$, $SE_b = .093$).

H6) Ideational fluency will be positively correlated with accurate evaluation of original ideas in a sample of business people.

The relationship between fluency and evaluative accuracy of original ideas was not quite as strong and with a slightly larger standard error of the estimate. In total, it was only close to significant at the 5% level with a $p = .069$. Again we found a negative beta value (standardized beta = $-.366$, $B = -.208$, $SE_b = .111$).

H7) Ideational originality will be positively correlated with accurate evaluation of popular ideas in a sample of business people.

The relationship between ideational originality and evaluation was not significant ($p = .369$) and is described with a standardized beta of $.137$, $B = .048$ and $SE_b = .053$.

H8) Ideational originality will be positively correlated with accurate evaluation of original ideas in a sample of business people.

The multiple regression does not show a significant relationship between ideational originality and the evaluation of original ideas $p=.837$ and standardized beta $=.038$, $B = .013$ and $SE_b = .063$.

10.2.2.1 The effect of eliminating originality as a predictor variable

The multicollinearity between fluency and originality can lead to a few problems in terms of interpretation. We wanted to take a look at the effect of removing originality from the regression. We were especially interested in how much it alters the relationship between fluency and evaluation of popular and original ideas, but also wanted to see if the findings changes when it comes to any of the other variables. Looking back at the Cronbach's alphas, this was only .39 for the originality score. This is normally considered as too low, a factor that must be considered in the analyses. For these reasons, we wanted to take a closer look at what happens when you take originality out of the regression.

In our case we had an r of .635 between originality and fluency. An $r=.6$ gives a 20 % increase in standard error of estimate of prediction and an r of .7 gives an increase of 40% in the standard error (Skog, 2004). Intercorrelation can thus lead to type 2 errors, in that coefficients will have to be larger in order to be statistically significant. It will also be difficult to determine the relative significance of the two factors, because we have few observations where one predictor is present and the other one is not.

If we choose to eliminate originality from the multiple regression using identification of popular ideas as the independent variable, we can see that R will only decrease by .006. R squared adjusted on the other hand increases when we eliminate originality because we have one less independent variable and because originality is highly correlated with fluency, thus adding to the standard error of the estimate.

Model Summary with ideational originality, evaluative accuracy of popular ideas

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,750(a)	,563	,469	,11927	1,794

Model Summary without ideational originality, evaluative accuracy of popular ideas

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,744(a)	,553	,471	,11900	1,743

Table 8: Model summary when eliminating originality, evaluation of popular ideas

Not including originality in the multiple regression will influence the fluency coefficient and standard error. As expected, the standard error of the partial coefficient decreases (SE_b decreases from .093 to .069) because we eliminate a factor that correlates highly with fluency. The partial slope itself is altered from -.264 till -.207 leading to a Standardized Beta of -.386 in stead of -.491.

Evaluative accuracy of popular/ normal ideas

Model	Unstandardized Coefficients		Standardized Coefficients	T	p
	B	Std. Error	Beta		
(Constant)	1,272	,190		6,679	,000
Education	,072	,026	,316	2,737	,009
Age	,001	,002	,077	,589	,560
working experience	,000	,003	,008	,061	,952
leadership experience	-,104	,038	-,316	-2,714	,010
Preference for ideation	-,132	,034	-,467	-3,845	,000
Tendency for prem. and critical evaluation	-,133	,025	-,684	-5,286	,000
Fluency total	-,264	,093	-,491	-2,845	,007
Originality total	,048	,053	,137	,910	,369

a Dependent Variable: total evaluation, normal

Evaluative accuracy of popular/ normal ideas without originality

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error	Beta		
(Constant)	1,270	,190		6,684	,000
Education	,072	,026	,315	2,736	,009
Age	,001	,002	,076	,583	,563
Working experience	,000	,002	-,026	-,204	,839
leadership experience	-,106	,038	-,322	-2,772	,009
Preference for ideation	-,135	,034	-,478	-3,963	,000
Tendency for prem. And critical evaluation	-,130	,025	-,669	-5,224	,000
Fluency total	-,207	,069	-,386	-3,022	,004

a Dependent Variable: total evaluation, normal

Table 9: Coefficients when eliminating originality, evaluation of popular ideas

The elimination of originality only alters the parameter estimates of the other predictor variables marginally and it does not affect which factors significantly relate to evaluative accuracy of popular ideas. The standard error of working experience decreases from .003 till .002 and the standardized beta alters from .008 to -.026, but the factor is still far from significant ($p = .839$).

Eliminating originality when looking at the evaluation of original ideas will leave R practically unchanged. Adjusted R Squared is then unsurprisingly higher in the model without originality (.237 in stead of .218).

Model Summary with ideational originality, evaluative accuracy of original ideas

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.597(a)	.357	.218	.14281	2,442

a Predictors: (Constant), Originality total, working experience, education, Preference for ideation, leadership experience, Tendency for prem. and critical evaluation, age, Fluency total
 b Dependent Variable: total evaluation, unique

Model Summary without ideational originality, evaluative accuracy of original ideas

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.597(a)	.356	.237	.14100

a Predictors: (Constant), age, Tendency for prem. and critical evaluation, leadership experience, education, Preference for ideation, Fluency total, working experience
 b Dependent Variable: total evaluation, unique

Table 10: Model summary when eliminating originality, evaluation of original ideas

Naturally, it is fluency that will be most significantly affected. In this case, the partial coefficient, B, will change from -.208 till -.193. Standard error of the coefficient will decrease from .111 to .081. The elimination of originality will leave fluency significant ($p = .023$ in stead of $p = .069$). It is not surprising that including a variable that is highly correlated into the analysis can lead to the fact that none of them is significant. This is because the high intercorrelation makes the parameter estimates become unreliable and we get a larger standard error.

Eliminating a factor that should have been included will lead to dependency between the residual and the dependent variable. One of the assumptions of regression is thus violated.

Lewis-Beck (1980) suggests that the estimation of a second model, eliminating the other correlating independent variable, will provide you with a bit of extra information about the damage done by specification error.

We have therefore eliminated fluency in a second model, leaving education, age, working and leadership experience, preference for ideation and critical evaluation, as well as originality as predictive variables. Eliminating fluency will decrease the R to .684 for the evaluation of popular ideas and adjusted R squared to .369. Originality is not significant, $p=.223$, with a negative B $=-.053$, SE = .043. With identification of original ideas as the dependent variable R decreases to .544 (from .597) and adjusted R square decreases to .166. Anova shows that the model as a whole is still significantly better at predicting the variation in evaluation of original ideas than a model without the current independent variables with an $p=.048$ slightly smaller than an alpha of .05.

The estimated partial slopes of the other independent variables are virtually unchanged and the same predictive variables are significant also when eliminating fluency.

10.2.3 The relationship between working experience and evaluative accuracy

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error	Beta		
Evaluation of popular ideas:					
working experience	,000	,003	,008	,061	,952
Evaluation of original ideas:					
working experience	-,001	,003	-,073	-,447	,658

Table 11: Regression, working experience as independent variable, evaluation of original and popular ideas

H9) Working experience will be negatively correlated with accurate identification of popular ideas in a sample of business people.

The analysis showed that working experience was unrelated to evaluative accuracy of popular ideas ($p = .952$, standardized beta = .061, B=.000 SE=.003).

H10) Working experience will be negatively correlated with accurate identification of original ideas in a sample of business people.

Working experience is not significantly related to the accurate identification of original ideas $p = .658$ and standardized beta $-.073$.

10.2.4 The relationship between leadership experience and evaluative accuracy

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error			
Evaluation of popular ideas:					
leadership experience	-,104	,038	-,316	-2,714	,010
Evaluation of original ideas:					
leadership experience	,052	,046	,159	1,128	,267

Table 12: Regression, leadership experience as independent variable, evaluation of original and popular ideas

H11) Leadership experience will be positively correlated with accurate identification of popular ideas in a sample of business people.

Leadership experience is significantly related to evaluative accuracy of popular ideas ($p = .01$). Somewhat surprisingly the two correlate negatively, with a standardized beta of $-.316$, $B = -.104$, $SE = .038$.

H12) Leadership experience will be positively correlated with accurate identification of original ideas in a sample of business people.

Leadership experience showed no significant relationship with evaluative accuracy of unique ideas ($p = .267$, Standardized Beta $= .159$, $B = .050$, $SE_B = .046$).

10.2.5 The relationship between education and evaluative accuracy

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error			

Evaluation of popular ideas:

Education	,072	,026	,316	2,737	,009
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Evaluation of original ideas:

Education	-,010	,031	-,044	-,311	,758
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Table 13: Regression, educational experience as independent variable, evaluation of original and popular ideas

H13) Educational length will be positively correlated with accurate evaluation of popular ideas in a sample of business people.

Educational length was positively correlated with accurate identification of popular ideas with $p=.009 < \alpha$ of .05, and the standardized coefficient Beta = .316.

H14) Educational length will be positively correlated with accurate identification of original ideas in a sample of business people.

Education is not significantly related to the evaluation of original ideas $p=.758$ and $B=-.010$.

10.2.6 The effect of age

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error	Beta		
Evaluation of popular ideas:					
Age	,001	,002	,077	,589	,560
Evaluation of original ideas:					
Age	,002	,003	,124	,780	,441

Table 14: Regression, including age as an independent variable, evaluation of original and popular ideas

We hypothesized that age would moderate the effect of working experience and leadership experience on evaluation. Age has therefore been included in the multiple regression. This will improve the overall model only slightly, with an R squared change of .004 for popular ideas and an R squared change of .011 for the identification of original ideas. As we can see by the table above, age is not significantly related to the accurate evaluation of popular or original ideas.

When looking at the accurate evaluation of popular ideas, including age will decrease the standardized beta of working experience from .042 to .008, neither is significant. The effect of leadership experience on evaluation is almost unchanged by the inclusion of age, suggesting that age does not moderate the relationship between the two. Correlation between age and leadership experience is only moderate $r=.151$.

The same results are found when considering evaluation of original ideas.

11 Discussion

The results indicated support for some of our hypotheses while others were not supported. This chapter provides some possible explanations for our findings and we suggest a few implications. We will throughout this section focus on what we consider the most important findings.

The respondents correctly identified more of each others popular (35%) than original ideas (32%). This is in accordance with the findings of Runco and Smith (1992).

11.1 The relationship between attitudes and evaluative accuracy

11.1.1 The effect of preference for ideation on evaluative accuracy

The results suggest that there is a negative association between preference for ideation and evaluative accuracy. Individuals who get a high score on preference for ideation are less likely to evaluate popular ideas accurately. This is in line with our hypothesis and consistent with the findings of Runco and Smith (1992).

Runco and Basadur (1991) found increases in the attitude active divergence after training and that the attitude preference for active divergence along with the CPSP Implementor score (creative problem solving profile), and the fluency total all moderated the relationship between pre- and post- evaluative scores. Preference for active divergence showed no significant relationship with evaluative skill before treatment, but after training a negative

correlation was significant. Their investigation differed from ours in that it measured intrapersonal evaluative accuracy, while we have focused on the evaluation of other people's ideas.

In our case, we looked at respondents currently active in business with or without leadership experience. Controlling for the effect of working and leadership experience we can still see a significant negative relationship between preference for ideation and evaluation of non-original ideas. Our study was also conducted outside of a training-setting, leading to the prediction that there is a significant negative relationship between the attitude preference for ideation and evaluation of popular ideas regardless of training.

People who get a high score on preference for ideation seem to be more accepting to the idea generating elements of the creative process. If the ideation-evaluation process is not acknowledged attitudinally then it is unlikely that ideation and evaluation occurs within the different elements. Basadur et al. (2000), claim that different ratios of ideation and evaluation might be optimal in different phases of the creative process for different fields. In our case we made up the problems for the respondents and let them go through an ideational phase where they came up with new ideas as well as an evaluative phase where they judged other people's ideas. In the evaluation phase the ideas were assessed by an objective standard (statistical frequency) and the ideas rated were unoriginal or common. Given these facts, it is possible that the evaluation of the uncreative or non-original ideas was an unfavorable setting for those with a high ratio of ideation/ preference for ideation.

Our finding might have one new and interesting implication. It could favor the use of teams consisting of individuals with different levels of the attitude preference for ideation when going through a creative process. In their research, Runco and Basadur (1990) altered the attitudes of the respondents by training. It seems as if preference for ideation might be constructive in some phases of the creative process, but not all of them, supporting the use of teams instead of modifications in attitudes.

Based on our findings our conclusion is that preference for ideation, irrespective of training, decreases the likelihood of accurately identifying popular ideas.

When it comes to the evaluation of *original* ideas, no relationship with preference for ideation was confirmed. It seems as the association between the variables are almost non-existing. Our second hypothesis, that there would be a negative relationship, was not confirmed by the regression analysis. Again, our findings were in line with those of Runco and Smith (1992).

It is interesting to see that the results for popular and original ideas are different. Runco and Smith (1992) suggest that we can find the explanation when you look at the strategies used for the evaluation. It is possible that a person chooses to compare popular ideas to ones own, but it is difficult to use this criterion to differentiate original ideas. Another suggested strategy is to estimate how many others are likely to come up with the idea. The strategies used and the effectiveness of those strategies might be affected by a persons attitudes.

Preference for ideation correlated negatively with the accurate identification of popular ideas. The attitude might influence a person towards too relaxed criterions of popularity. It is for example possible that a persons who prefer novelty and creativity look for original elements in all ideas. Preference for innovation also involves looking for continuous improvements in ideas and solutions, which in turn may lead to the identification of creative potential even when the idea is in fact not original. People who get a high score on preference for ideation try to think of highly original ideas and might thus be unable to see ideas that are similar to their own as unoriginal. All in all, those who get a high score on the attitude preference for ideation might actively look for creative potential in ideas and hence systematically gives popular ideas better scores than they deserve.

A different strategy might be enforced when trying to identify original ideas. When evaluating original ideas one does not have the opportunity to compare with ones own. A suggested strategy in that case is to estimate how many people might have provided that particular answer. It is likely that those who get a high and those who get a lower score on preference for ideation use approximately the same strategy to identify original ideas and that the attitude does not influence the effectiveness of the strategy significantly. A person getting a high or a low score on preference for ideation will have the same prerequisite for solving the evaluative tasks, leading to small differences in evaluative accuracy.

Different strategies when identifying original and popular ideas could be the reason why preference for ideation has a negative effect on evaluative accuracy of popular ideas and no

effect on the identification of original ideas. This interpretation has to be checked carefully against other possible interpretations in a more experimental setting, but if true, one should focus on giving people realistic strategies to identify ideas as original or not. Another way to help the evaluative elements throughout the creative process could be the use of teams who can contribute with different levels of preference for ideation and different strategies for evaluative accuracy.

11.1.2 The effect of preference for premature closure on evaluative accuracy

As we suggested in our hypotheses it seems as if preference for premature closure is negatively related to evaluative accuracy. Both the evaluation of popular ideas and evaluation of original ideas tend to be less accurate when this attitude manifests itself. We based our hypotheses on some reasoning in regards to the content of the attitude, along with prior research conducted within this field. It is likely that people eager to get finished with the evaluation in a hurry has a higher probability of making mistakes in their judgments. This is likely to result in imperfect evaluation of both popular and original ideas. When evaluating original ideas it is also possible that instead of appraising good ideas, they look for flaws and shortcomings that in their eyes reduce the originality of the ideas.

Our findings confirm that of earlier research in the field also when the respondents are active in business and regardless of training. Runco and Basadur (1993) focused on avoidance of the attitude preference for premature closure to better the evaluative accuracy. Their research showed that such avoidance could be achieved through training in the complete creative process. In this case, avoiding the attitude leads to a greater acceptance of the evaluative process. Basadur et al. (2000) mentions this acceptance as a prerequisite for the ideation-evaluation process to occur and especially for the evaluative elements.

In conclusion, it seems that both preference for ideation and preference for premature closure decrease the likelihood of correct evaluation in a business setting. Organizations that want to foster accurate identification of popular and original ideas should therefore focus on the avoidance of preference for premature closure through training and hiring. Preference for ideation, although negatively correlated with evaluative accuracy of popular ideas, has the potential to have a positive effect on other variables, such as ideational fluency. One should

therefore not decrease the preference for active divergence. This supports the use of teams consisting of members with different attitudinal preferences.

11.1.3 The relationship between creative potential and evaluative accuracy

Before we consider the effect of ideational originality and fluency on evaluative accuracy, it is important to take a look at the correlation between originality and fluency. We have chosen to include both variables in the regression because they seem to measure two rather distinct areas of creative potential. It is therefore probable that we can get more information when including them both in the regression. As mentioned, it has been suggested that a larger number of ideas (ideational fluency) will lead to a larger number of original ideas (measured by ideational originality). Research has been somewhat supportive of this thought and it is normal that the two correlates moderately to highly. This moderate intercorrelation was also found in our study.

11.1.4 The effect of ideational fluency on evaluative accuracy

In this case we found that there was a significant negative relationship between fluency and evaluative accuracy of popular ideas. Our findings stand in contrast to those of Runco and Smith (1992), Basadur et al. (2000) and Runco and Basadur (1993) who all discovered that an increase in ideational fluency would lead to an increase in evaluative accuracy of popular ideas. There is none the less one important difference in their studies and our. Basadur et al. (2000) and Runco and Basadur (1993) only measured intrapersonal evaluation and Runco and Smith (1992) found that interpersonal evaluative accuracy was unrelated to divergent thinking. Studies on evaluative accuracy have found interpersonal and intrapersonal skills to be distinct (Charles and Runco, 2000-2001; Runco and Smith, 1992). This is significant because the two evaluative skills lead to the use of different perspectives, knowledge, information and strategies. In the case of intrapersonal ideas you have more information on how the idea manifested itself. For interpersonal ideas you have the advantage of being an observer, looking at the idea from the outside, but you lose the information about where the idea originated.

There was also a negative relationship between ideational fluency and evaluative accuracy of original ideas, again opposite of our initial hypothesis. An increase in ideational fluency is related to less accurate evaluation of original ideas. The tendency, however, is not significant, although close. As we saw in the result section eliminating originality will leave fluency significant, because it decreases the standard error of the estimate. We can say nothing for certain on the relationship between fluency and evaluative accuracy of original ideas, but only consider possible explanations for the negative correlation. Further research is needed to verify the relationship.

As mentioned in the section on attitudes, people are likely to rely on strategies to help them to evaluate other people's ideas. One strategy pointed out by Runco and Smith (1992) is the comparison people make between their own ideas and the ideas they are to evaluate. If evaluators compare ideas evaluated with their own ideas, then higher fluency can lead to less stringent demands for what an original idea is because people want to consider their own ideas as more original than they in fact are. In such cases the result will be a negative relationship, as in our case. Rubenson and Runco (1992) suggested in connection with their psychoeconomic theory that a person could have an emotional investment in their own ideas. This could lead to a misjudgement of ideas that are similar to ones own and quite subjective evaluations. Someone who comes up with a lot of ideas might have ideas that are related to most of the ones being judged and this might influence the evaluation negatively.

11.1.5 The effect of ideational originality on evaluative accuracy

We did find a positive correlation between divergent thinking originality and popular and original ideas. The relationship was not significant, indicating that we can not conclude on the association between ideational originality and accurate evaluation of popular and original ideas. Because of multicollinearity it is still difficult to say that ideational originality does not affect evaluative accuracy, at least for popular ideas. Multicollinearity will in this case lead to an approximately 30% larger standard error of estimate, making it difficult to provide a significant finding. We also had a very low reliability score when it came to ideational originality. The findings on originality should therefore not be emphasized greatly.

Prior research by Runco and Vega (1990) found the relationship to be positive, ideational originality led to more accurate evaluation of both popular and original ideas. In our reasoning for the hypothesis we argued that people generating many original ideas themselves may be better at recognizing original idea given by others. As in the case of fluency, evaluators compare ideas evaluated with the boundaries of their own minds. Our participants are judging ideas given by others. Previous research indicates difficulty in identifying original ideas given by others. It is possible that this difficulty neutralizes positive effects coming from own originality or from other sources.

11.1.6 The relationship between working experience and evaluative accuracy

We suggested that working experience would have a negative effect on evaluative accuracy of both original and popular ideas, but no significant relationship between working experience and accurate evaluation of popular ideas manifested itself. The standardized beta value was positive, but quite small, leaving the factor far from significantly related to the accurate evaluation of popular ideas. The same thing goes for the relationship between experience and accurate evaluation of original ideas. In this case the tendency would be negative, but again the beta value was too low and the level of significance too high to make us read something into it.

The lack of correlation between the variables could be explained in a number of ways. Maybe work experience in fact does not affect evaluative accuracy of other people's ideas. That could be possible if the job done does not entail too much experience with the evaluation of interpersonal ideas. In our case leadership experience is checked for and as Mumford (2002) points out, leaders are likely to get more know-how than others within the field of evaluation because this is an important part of their job.

It might be that there are both negative and positive effects of work experience on evaluative accuracy. Runco and Vega (1990) provided a finding explaining a positive relationship between experience and evaluative accuracy, while psychoeconomic theory stressed the prospective effects of inflexibility leading to a prediction of a negative relationship between experience and both evaluative scores. All in all, the effect of the two can be small or non-existent.

The reason for the lack of correlation could also be statistical. Only 57 respondents were included in our final analysis. We had a range of occupations and the number of years people had been active in business varied greatly. None the less, all of our participants had some degree of work experience, making it difficult to say if there could be a difference between people with or without work experience.

The psychoeconomic theory bases its inflexibility-hypothesis on the fact that the person has something to loose by choosing and implementing an original idea. In our case, the respondents had to be allowed anonymity, and the ideas would not be implemented. It is therefore likely that they didn't feel that they had much to loose. This could also be a factor that interplayed so as to leave the work experience factor unrelated to evaluation of both original and popular ideas.

The lack of significance may also be a result of the type of divergent thinking tasks used. The more playful task could have been exchanged for tasks that were more relevant to the respondent's professions. With the current tasks, the experience gained through their work might not have given them an advantage or a disadvantage when performing the present exercises. Our respondents also had a wide variety of different professions ranging from shop assistant, construction manager and lawyer to head of design for an international car manufacturer and leadership positions for companies and departments, making it difficult to give everyone tasks that were equally familiar. Runco, Dow and Smith (2006) found that divergent thinking scores were dependent on how well a person knows a certain domain. This could also be the case for evaluation. It might be that knowledge gained from work experience is domain specific rather than general. This will limit the value of moving people from one area of business to another, because evaluative accuracy will not necessarily improve if the new domain is not well known. It will among other things favor people with a great deal of relevant domain specific knowledge in the case of recruitment, especially for jobs consisting of a great deal of idea evaluation, as is the case for leaders. This would be an interesting subject for further research.

11.1.7 The relationship between leadership experience and evaluative accuracy

A significant fraction of a leaders work consists of choosing between different ideas. This led us to expect a positive relationship between leadership and evaluative accuracy of both popular and original ideas. Neither of these hypotheses was confirmed. On the contrary, an interesting finding was the tendency for leadership experience resulting in less accurate evaluation of popular ideas than no leader experience. As we see, leadership experience was in fact negatively correlated with accurate evaluation of popular ideas.

The tendency for leader experience to result in less accurate evaluating of popular ideas came as a surprise to us. Most of the argumentation for our hypothesis is also found in the argumentation for our hypotheses about working experience and evaluative accuracy. We found it even more likely that people with leadership experience benefited from previous experience with choosing ideas. We therefore suggested that leadership experience would have a positive effect on accurate evaluation. On the contrary it seems that persons with leadership experience actually are less accurate when evaluating popular ideas.

We will attempt to present some possible explanations for this finding. There is little research and literature to rely on.. We will therefore like to emphasize the fact that these are only possible explanations, and not a complete list of possible solutions.

One possible hypothesis can be derived from psycoeconomic theory. It is possible that throughout their career they feel that they have invested so much time and effort in their workplace that they are unwilling to accept new ways of thinking. The fact that they are in leader positions also suggests that they have been successful in their previous actions, and perhaps believe that this formula will lead to success also in the future. Investments and positive feedback may lead to inflexibility and a failing to understand that renewal and new channels of thoughts.

Again the divergent thinking tasks can have an effect on the result, suggesting that knowledge gained through leadership experience might not contribute positively to evaluative accuracy in general. Rather that the advantage leadership experience might be domain specific.

Creativity and originality have traditionally not been as valued in organizations as it ought to. If it is true that leaders tend to rely on their experience, they may disregard new impulses emphasizing creative thought, due to inflexibility as described in psychoeconomic theory, or because they fail to see the importance of it. If they are not interested in originality in ideas, it may be difficult to evaluate ideas accurately. One could argue that if leaders are likely to value more traditional ideas, it may be tempting for them to provide popular ideas with higher scores than they deserve. This may be an attempt to defend own opinion and investments, or just a result of the fact that similar ideas have been evaluated positively in the past, and that leaders believe that this is in fact the correct score for those ideas.

The relationship between leadership experience and the evaluation of original ideas was as hypothesized positive, but this relationship was not quite significant. It is hard to say for certain why this factor did not turn out to be significant, but a likely explanation is a statistical one. Considering that we had so few respondents in our final analysis the correlation needs to be rather high to get a significant result. Leadership experience was also operationalized as a dichotomized variable, considering the difficulty in categorizing levels of leadership experience. Unfortunately, you lose quite a bit of information in this process. This could also help explain why we did not get a significant finding. We will look at reasons why it is likely that the positive correlation could be realistic. Bearing in mind that we do not have a significant result, the relationship between leadership experience and evaluation of original ideas should be further researched to see if our suggestions could be confirmed.

With his work on creative leadership, Mumford (2002) discovered that one of the leader's most important responsibilities was the evaluation of other people's ideas and that a lot of time was spent on this subject. Recognizing originality is only an element in the evaluative process, but it is a first step towards discovering ideas that are worth pursuing in a business setting. It is therefore likely that people with leadership experience consider this element when evaluating ideas, contributing to their knowledge on the subject. An idea that is useful, but not original, would probably be of little value to the organization, giving leaders an incentive to judge ideas based on their newness.

In our study we have measured something quite similar to what Mumford (2002) have concluded that leaders do on a regular basis, namely the participants' ability to correctly identify other people's ideas as original. Leadership experience is therefore likely to

contribute to knowledge on the identification of original ideas as well as understanding on the subject. When faced with a task frequently it is also natural to try out different strategies. Leadership experience might therefore contribute to evaluative accuracy in that repeated experience gives way for more successful strategies. The use of strategies has been mentioned several times, because it is closely linked to evaluative accuracy.

11.1.8 The relationship between educational length and evaluative accuracy

The hypothesis that educational length would have a positive effect on evaluative accuracy of popular ideas was supported. Educational length is, indeed, associated with more accurate evaluation of popular ideas. It could be argued that the better educated one is, in terms of years of education, the better an understanding one gets about what constitutes a popular idea. This in turn leads to enhanced likelihood of correct identification of popular ideas.

We argued that knowledge, expertise and attention on evaluation gained through education form a better basis when evaluating popular ideas. In fact this turned out to be a sound assumption, as the findings confirm a positive relationship. It is possible that the ones that are better educated are better equipped to think of good strategies to help them evaluate the ideas. They might be able to distance themselves more from their own ideas and consider the ideas on their own. This could improve the evaluations by making them less subjective.

A person's level of education is normally associated with their level of intelligence. As mentioned in our literature review Runco and Smith (1992) found that evaluative accuracy was independent of traditional measures of intelligence. To be certain that intelligence was in fact not the actual reason that education was positively related to evaluation we included grad point average in our research. Including it in the multiple regression did not alter the relationship between education and evaluative accuracy of popular ideas, confirming the work of Runco and Smith (1992). Grade point average was not included in our final multiple regression because quite a few people found it uncomfortable to answer a question about grades and some did not remember exactly what their grade point average was.

The relationship between educational length and accurate evaluation of original ideas turned out not to be significant. Actually the tendency reported a reverse sign; where educational

length led to less accurate evaluation of original ideas, but so small that we can not read anything into it.

Again it is interesting to see that the results are different for the identification of popular and original ideas, supporting the suggestion that people use different strategies to evaluate the two and different skills, attributes and attitudes are needed. This tendency was also found in the research of Runco and Smith (1992).

12 Conclusion and suggestions for further research

In line with the results of Basadur, Runco and Vega (2000), we found that the identification of original and non-original ideas required different skills and attitudes. This is an interesting point because it emphasises the importance of the type of task being evaluated when considering the skills and attitudes necessary. The fact that different situations calls for different skills and attitudes favor the use of teams when going through the evaluative phase as well as the rest of the creative process. The creativity literature, and evaluation is not an exception, has so far focused the most on the individual. Our results might call for more research looking into the use of team for the creative process, especially when it comes to the evaluative phase. This is further enhanced by the fact that there was a negative relationship between coming up with ideas and evaluating accurately. It is therefore likely that any one individual would struggle if they were to go through both the ideational and evaluative activities alone. In this context, it would also be interesting to see how accurately an individual will evaluate his own ideas as opposed to others people's ideas in a business setting.

Working on our thesis we have read a lot of literature on creativity in general as well as evaluation. Going through the existing research it struck us how often evaluation was mentioned as an essential factor when it comes to creativity and how few researchers had actually examined this factor more closely. Although almost every model of creativity incorporates some sort of evaluative activity, not much had actually been written to cover this subject. Our own contribution is to expand this perspective, and to investigate how personal and job factors were related to evaluation of creative ideas. Given the importance of this

element and the absence of a full body of research within this field, much more should be done to explore evaluation.

More focus on evaluation may improve our understanding of the models, and also be helpful in situations where evaluation of creative efforts are of importance, whether it is inside organizations or not. Since we found meaningful and potentially important relationships, we will suggest that it may be profitable for further research to look more closely into the relationship between different personality traits and situational factors that may influence evaluative accuracy. In creative thinking several traits have been found to have an effect on the process, such as independence, seriousness, low conformity, self-sufficiency and experimentation, persistence, self confidence etc. Our findings also seem to confirm that it might be interesting, independent of creativity, to identify traits that enhance or inhibit evaluative accuracy. Our findings also suggest that there may be some dynamic interactions and trade offs between creative potential and evaluative accuracy, and hence it might be interesting to identify traits that enhance both creative potential and evaluative accuracy and creative ideas, in order to gain a more precise knowledge of the dynamics between ideation and evaluation.

In psychoeconomic theory (Rubenson & Runco, 1992) the relation between knowledge and evaluation is discussed. Apart from that, the literature on cognition and motivation in the evaluative context of creativity seems almost non-existent. In order to comprehend the areas concerning evaluation, it is of importance that all these potential relationships are explored. With our research we tried to improve the understanding of experience with work, education and leadership, creative potential and attitudes in evaluative activities. The relationship between motivation and evaluation was not considered in our research and it would be an interesting area for further research. One suggestion is to look at the possible interactions between intrinsic/ extrinsic motivation and evaluation. Another important possibility is to take a closer look at how people think and what kind of strategies they use to evaluate ideas. In this way one might identify potentially effective approaches.

In our research we have focused on the two best known and studied attitudes in the creative context. It would be interesting to see if there are other attitudes that may influence evaluative accuracy more vigorously than these two. Basadur and Hausdorf (1995) found three attitudes that predict creativity; “valuing new ideas,” “creative individual stereotypes” and “too busy

for new ideas.” One possibility would be to examine if these attitudes also play influential roles in evaluative activities. Looking back, one can also see that most of our variables correlated negatively with evaluative accuracy. It is possible that variables undermining creativity might be more influential than the ones leading to it. This would be a very important and interesting topic for further research.

Also organizational differences may have an effect on evaluative accuracy of individuals. We looked at working experience and leadership experience. Previous research on leadership has focused on training and then looked for improvements in inter and intra evaluative accuracy. Our participants evaluated ideas given by others, and this was performed without any foregoing training session. Given the importance of evaluation, judgment and decision making in leader’s work it may be interesting to see if leaders differ in their accuracy when evaluating other’s ideas and their own ideas.

Achieving a more coherent view of the creative process is difficult and assessing it is no less challenging. Feldhusen and Goh (1995) conclude that “further research is needed to clarify how measures of creativity can be combined to derive a composite picture of creative capacity in individuals”. Measuring creativity or creative potential is thus difficult, leading to challenges also in the context of evaluation. Existent research on evaluation in the present status of creativity field is limited, and seems poorly organized. There is thus a need a more integrated and coherent view on the subject with specification of what kinds of processes, elements and factors that are important for the activity selecting and evaluating ideas that are worth while pursuing for innovative purposes.

Causal research will always lead to challenges when determining the relationship between the included factors and in determining what factors might have been omitted. The statistical methods only specify that there is a relationship, not the direction of this and therefore stress that you have the opportunity to look at prior theories and research. Evaluation has been an underrated subject of research and it was difficult to find enough literature to support some of our hypotheses. We only offer these results as tentative at the present state. The results of our cross-sectional study should be further supported using controlled, experimental studies with a larger number of respondents.

13 Summing up

We started off this section of the paper by presenting a gap in the literature. Evaluation is an understudied field of research and subjects such as personality, attitudes and leadership experience are hardly mentioned. In the end, this is only a small contribution to the field, but still, a starting point for further research.

The most salient findings are that the attitude preference for ideation was negatively correlated to popular evaluative skills, while acceptance for premature closure was negatively correlated to both evaluations of popular and original ideas. Of the creativity factors, ideational fluency was significantly related to evaluative accuracy, but only with evaluative accuracy of popular ideas. Working experience was close to uncorrelated with evaluative accuracy, whereas a negative relationship was found between leadership experience and evaluative accuracy of popular ideas. Our final finding was that educational length was positively correlated with evaluative accuracy of popular ideas. The table below shows a simple summary of the relevant relationships.

Significant correlations	Evaluative accuracy of popular ideas	Evaluative accuracy of original ideas
Preference for ideation	X (-)	
Preference for closure	X (-)	X (-)
Ideational fluency	X (-)	
Ideational originality		
Working experience		
Leadership experience	X (-)	
Education	X (+)	

Table 15: Summary of results

Some interesting findings have manifested themselves throughout our study, some consistent with previous research, and some inconsistent. This implies that the field is very complex and that different processes and abilities are needed in different situations.

Quite a few of our results showed that the identification of original and non-original ideas required different skills and attitudes. It seems to be differences when evaluating own ideas and the ideas of others, due to underlying processes, information and assumptions. The differences have implications for both the understanding and measurement of creativity as a concept. Within the field of psychometric measurement theory there is a discussion regarding reflective and formative measurements. By reflective measurements one thinks of the measurements to be an indicator of an underlying core concept, both operationally and conceptually. The different results may indicate that creativity is a meaningful concept, but not fully operational. The best way to deal with it may be to use formative measurements, where the indicators may be both correlated and uncorrelated.

The differences also have practical implications. Different individuals are good at different stages of the creative process. It may be so that tradeoffs have to be made, that a person good at one stage has to trade off abilities in another stage, making the person worse off in this stage. One example may be a person good at the idea generation stage, but not on the evaluation stage, or vice versa (Runco & Chand, 1994). Once more, the best approach to the creative process may be through teams.

14 Biographies

- Amabile T.M. (1988). From Individual Creativity to Organizational Innovation. In K. Gronhaug & G. Kaufmann (Eds.) *Innovation: A Cross-disciplinary Perspective* (pp. 139-166). Oslo, Norway: Norwegian University Press.
- Amabile, T.M. (1992). Social Environments that Kill Creativity. In S.S. Grysiewicz & D.A. Hills (Eds.), *Readings in Innovation* (pp. 1-17). Greensboro, N.C.: Center for Creative Leadership.
- Amabile, T. M. & Collins, M.A. (2004). Motivation and Creativity. In R.J. Sternberg (Ed.), *Handbook of Creativity* (pp. 297-313). Cambridge, UK: Cambridge University Press.
- Bailin, S. (1991). *Achieving extraordinary ends: An essay on creativity*. Norwood, NJ: Ablex.
- Basadur, M.S., & Finkbeiner, C.T. (1985). Measuring preference for ideation in creative problem solving training. *Journal of Applied Behavioral Science*, 21, 37-49.
- Basadur M, Graen G. B. & Scandura T. A. (1986). Training Effects on Attitudes Toward Divergent Thinking Among Manufacturing Engineers. *Journal of Applied Psychology*, 71, 612-617.
- Basadur, M. & Hausdorf, P.A (1996). Measuring Divergent Thinking Attitudes Related to Creative Problem Solving and Innovation Management. *Creativity Research Journal*, 9, 21-33.
- Basadur M., Runco, M.A & Vega, L.A (2000). Understanding how Creative Thinking Skills, Attitudes and Behaviors Work Together: a Causal Process Model. *Journal of Creative Behavior*, 34, 77-100.
- Bazerman, M. H. (2002). *Judgment in Managerial Decision Making* (5th ed.). New York: Wiley.
- Becker, G.S. (1975). *Human Capital* (2nd ed.), New York: National Bureau of Economic Research.
- Boden (2004). In Kaufmann, G. Two kinds of creativity: But which ones?. *Creativity and Innovation Management*, 13 154-165.
- Brophy D.R. (1998). Understanding, Measuring and Enhancing Collective Creative Problem-solving Efforts. *Creativity Research Journal*, 11, - .
- Charles, R. and Runco, M. (2000-2001). Developmental Trends in the Evaluation and Divergent Thinking of Children. *Creativity Research Journal*, 13, 417-437.

- Cheng, P.C., Lau, S., Chan, D.W. & Wu, W.Y.H. (2004). Creative Potential of School Children in Hong Kong: Norms of the Wallach-Kogan Creativity Tests and Their Implications. *Creativity Research Journal*, 16, 69-78.
- Clapham, M. (2004). The Convergent Validity of the Torrance Tests of Creative Thinking and Creativity Interest Inventories. *Educational and Psychological Measurement*, 64, 828-841.
- Cronbach, L.J. (1951). Coefficient Alpha and the Internal Structure of Tests. *Psychometrika*, 16, 297-334.
- Czikzentmihalyi, M. (2004). Implications of a System Perspective to the Study of Creativity. In R.J. Sternberg (Ed.), *Handbook of Creativity* (pp. 313-339). Cambridge, UK: Cambridge University Press.
- Farris (1972). In M.D Mumford., G.M Scott, B. Gaddis & J.M. Strange, (2002). *Leading Creative People: Orchestrating Expertise and Relationships*. The leadership quarterly, 13, 705-750.
- Feist G.J. (1999). The Influence of Personality on Artistic and Scientific Creativity. In R.J. Sternberg (Ed.), *Handbook of Creativity* (pp. 273-297). Cambridge, UK: Cambridge University Press.
- Feldhusen, J.F & Goh, B.E (1995). Assessing and Accessing Creativity. *Creativity Research Journal*, 8, 231-247.
- Feldman, D.H, Csikszentmihalyi, M & Gardner, H. (1994). *Changing the World: A Framework for the Study of Creativity* (pp. 145-158). Westport: Praeger.
- Finke, R.A., Ward, T.B & Smith, S.M. (1992). *Creative Cognition – Theory, Research and Applications*. Cambridge, Massachusetts: MIT Press.
- Gardner, H. (1993). *Creating Minds: An Anatomy of Creativity Seen Through the Lives of Freud, Einstein, Picasso, Stravinsky, Eliot, Graham, and Gandhi*. New York: Basic
- Ghauri, P. & Gronnhaug, K. (2002). *Research Methods in Business Studies*. London: prentice Hall.
- Grimm, L.G & Yarnold, P.R (1995). *Reading and Understanding Multivariate Statistics*. Washington: American Psychological Association.
- Groborz, M. & Necka E. (2003). Creativity and Cognitive Control: Explorations of Generation and Evaluation Skills. *Creativity Research Journal*, 15, 183-197.

- Guilford J. P. (1959). Three faces of intellect. *The American Psychologist*, 14, 469-479.
- Guilford, J. P. (1967). *The Nature of Human Intelligence*. New York: Harper & Row.
- Guilford, J. P. (1968). *Intelligence, Creativity and Their Educational Implications* (1st ed.). San Diego: R. R. Knapp.
- Harrington, D.M (1975). Effects of Implicit Instructions to “Be Creative” on the Psychological Meaning of Divergent Thinking Scores. *Journal of Personality*, 43, 434-454
- Haukedal, W. & Kuvaas, B. (2004). *Creativity and Problem-Solving in the Context of Business Management*. Bergen, Norway: fagbokforlaget
- Helson, R (1988). The Creative Personality in Innovation In K. Gronhaug & G. Kaufmann (Eds.) *Innovation: A Cross-disciplinary Perspective*. Oslo, Norway: Norwegian University Press.
- Houtz J.C., Montgomery, C., Kirkpatrick, L. & Feldhusen, J.F.(1979). Relationships among measures of evaluative ability, creative thinking, and intelligence. *Contemporary Educational Psychology*, 4, 47-54.
- Hsiang & Liang (2003). Divergent thinking: a function-specific approach. *World transactions on Engineering and Technology Education*, 34, 130-137
- Hurley, J. (2003). *Scientific Research Effectiveness: The Organizational Dimension*. Boston, MA: Kluwer Academic Publishers
- Jaccardi, J., Turrusi, R. & Wan, C. (1990). *Interaction Effects in Multiple Regression*. Thousand Oaks, CA: Sage Publications, inc.
- Kaufmann, G. (2005). *Hva er kreativitet*. Oslo: Universitetsforlaget
- Kaufmann, G. (2004). Two kinds of creativity: But which ones?. *Creativity and Innovation Management*, 13 154-165.
- Kerr, B. & Gagliardi, C. (2003). Measuring Creativity in Research and Practice. In Lopez, Shane & Snyder, C. R. (Ed.), *Positive Psychological Assessment: Handbook of Models and Measures* (pp. 155-171). Washington, DC: American Psychological Association.
- Koehler D.J. & Harvey N. (eds.) (2004). *Blackwell Handbook of Judgment & Decision making*. Oxford, UK: Blackwell Publishing
- Lewis-Beck, M. S. (1980). *Applied regression*. Thousand Oaks, CA: Sage Publications, inc.

- MacKinnon, D.W. (1962). The Nature and Nurture of Creative Talent. *American Psychologist*, 17, 484-495.
- McCrae, R (1987). Personality Processes and Individual Differences. *Journal of Personality and Social Psychology*.
- Mednick, S.A. (1962). Remote Associate Test. *Journal of Creative. Behavior*, 2, 213-214.
- Morgan, G.A & Griego, O. (2001). *SPSS for Windows*. New Jersey: Lawrence Erlbaum Associates.
- Mumford, M.D., Scott, G.M., Gaddis, B., & Strange, J.M., (2002). Leading Creative People: Orchestrating Expertise and Relationships. *The leadership quarterly*, 13, 705-750.
- Mumford, M. (2000-2001). Something Old, Something New: Revisiting Guilford's Conception of Creative Problem Solving. *Creativity research Journal*, 13, 267-276.
- Mumford, M., Marks, M.A., Connelly, M.S., Zaccaro, S & Johnson, G. (1998). Domain-Based Scoring of Divergent-Thinking Tests: Validation Evidence in an Occupational Sample. *Creativity Research Journal*, 11, 151-163
- Osborn, A.F (1953). *Applied Imagination*. New York: Scribner
- Pallant, J. (2003). *SPSS Survival Manual* (11th ed.). Buckingham: Open University Press.
- Plucker, J. A & Runco, M.A (1998). The Death of Creativity Measurement Has Been Greatly Exaggerated: Current Issues, Recent Advances, and Future Directions in Creativity Assessment. *Roeper Review*, 21, 36-39.
- Proctor, T. (2005). *Creative Problem Solving for Managers* (2nd ed.). London: Routledge.
- Rhodes, M. (1961/1987). An analysis of creativity. In SG Isaksen. (Ed.), *Frontiers of creativity research: Beyond the basics* (pp. 216–222). Buffalo, NY: Bearly Limited.
- Robbins, S. (2005). *Organizational behavior* (11th ed.). Englewood Cliffs, NJ: Prentice Hall.
- Rubenson D.L & Runco, M.A (1992). The psychoeconomic approach to creativity. *New Ideas in Psychology*, 10, 131-147
- Rubenson, D.L. & Runco, M.A, (1995). The Psychoeconomic View of Creative Work in Groups and Organizations. *Creativity and Innovations Management*, 4, 232-241

- Runco, M. A., & Vega, L. (1990). Evaluating the Creativity of Children's Ideas. *Journal of Social Behavior and Personality*, 5, 439-452.
- Runco, M. A. (1991). Objectivity in the Measurement of Creative Thinking. In M.A. Runco, *Divergent thinking* (pp. 183-187). New Jersey: Ablex Publishing Corporation.
- Runco, M. A. (1991-1). Dimensions of Divergent Thinking. In M. A. Runco *Divergent thinking* (pp. 87-125). New Jersey: Ablex Publishing Corporation.
- Runco, M.A. (1991-2). The evaluative, valuative, and divergent thinking of children. *Journal of Creative Behavior*, 25, 311-319.
- Runco, M & Smith, R (1992). Interpersonal and intrapersonal evaluation of creative ideas, *Personality and Individual Differences*, 13, 295-302.
- Runco, M. A., & Basadur, M. (1993). Assessing Ideational and Evaluative Skills and Creative Styles and Attitudes. *Creativity and Innovation Management*, 2, 166-173.
- Runco, M. A., & Chand, I. (1993). Cognition and creativity. *Educational Psychology Review*, 7, 243-267
- Runco, M. A. (1994). *Problem finding, problem solving, and creativity*. Norwood, NJ: Ablex.
- Runco, M. A., & Chand, I (1994). Problem finding, evaluative thinking, and creativity. In M. A. Runco (Ed.), *Problem finding, problem solving, and creativity* (pp. 40-76). Norwood, NJ: Ablex.
- Runco, M. A. (1999). Divergent Thinking. In M.A Runco & S. Pritzker, *Encyclopedia of Creativity*. San Diego, CA: Academic Press.
- Runco, M.A (2004). Creativity. *Annual Review of Psychology*, 55, 667-687.
- Runco, M.A, Dow, G & Smith, W. (2006). Information, Experience, and Divergent Thinking: An Empirical Test. *Creativity Research Journal*, 18, 269-277.
- Ryan, R.M. & Deci, E.L, (2000). Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *American Psychologist*, 55, 68-78
- Santanen, E & Vreede, G (2004). Creative Approaches to Measuring Creativity: Comparing the Effectiveness of Forur Divergence thinkLets. *System Sciences, Proceedings of the 37th Annual Hawaii International Conference*.

- Simonton, D.K (2004). Creativity from a Historiometric Perspective. In R.J. Sternberg (Ed.), *Handbook of Creativity* (pp. 116-137). Cambridge, UK: Cambridge University Press.
- Skog, O.J (2004). *Forklare sosiale fenomener, en regresjonsbasert tilnærming*. Oslo: Gyldendal akademiske forlag.
- Smith SM, Ward TB, Schumacher JS (1993). Constraining Effects of Examples in a Creative Generation Task. *Memory and Cognition*, 21, 837-845
- Sternberg, R.J. (ed.) (2004). *Handbook of creativity*. Cambridge, UK: Cambridge University Press
- Sternberg, R.J. Grigorenko, E.L & Singer, J.L. (eds.) (2004). *Creativity, From Potential to Realization* (1st ed.). Washington, DC: American Psychological Association.
- Sternberg R.J. & Lubart, T.I. (2004). The Concept of Creativity: Prospects and Paradigms. In R.J. Sternberg (Ed.), *Handbook of creativity* (pp.3-16). Cambridge, UK: Cambridge University Press.
- Sternberg R.J. & O'Hara, L. (1999). Creativity and Intelligence. In R.J. Sternberg (Ed.), *Handbook of Creativity* (pp. 297-313). Cambridge, UK: Cambridge University Press.
- Styhre, A. & Sundgren, M. (2005). *Managing creativity in organizations: Critique and Practices* (Book manuscript). Gothenburg, Sweden : Palgrave, Chalmers University of Technology.
- Szymanski, K. & Harkins, S.G. (1992). Self-Evaluation and Creativity. *Personality and Social Psychology Bulletin*, 18, 259-265.
- Wallach, M.A. & Kogan, N. (1965). *Modes of Thinking in Young Children: a Study of the Creativity-Intelligence Distinction*. New York: Holt
- Wallas, G (1926). *The Art of Thought*. New York: Harcourt Brace.
- Ward, T.B., Smith, S.M & Finke, R.A. (2004). Creative Cognition. In R.J. Sternberg (Ed.), *Handbook of creativity* (pp. 189-213). Cambridge, UK: Cambridge University Press
- West, M.A., Hirst, G., Richter, A. and Shipton, H. (2004). Twelve Steps to Heaven: Successfully Managing Change Through Developing Innovative Teams. *European Journal of Work and Organizational Psychology*, 13, 269-299.

Wright R.F. (1992). *Fostering Creativity and Innovation in a New-Product Research Group in Readings in Innovation*. Greensboro, NC: Center of Creative Leadership.

Yukl, G. (2002). *Leadership in Organizations*. New Jersey: Prentice Hall.

Oestergren, K. (2005). *Project Management Lecture*. Norwegian School of Business and Administration Management

Webpages:

Williams, R. (2006) <http://www.nd.edu/~rwilliam/stats2/l11.pdf>

wordreference dictionary (2006)

http://www.wordreference.com/definition/divergent_thinking

15 Appendix A

1) Divergent thinking tasks

 1. Skriv opp så mange **sterke ting** du kan

Tilgjengelig tid 5 minutter

(Name all the strong things you can think of in five minutes)

 2. Skriv opp ting man kan bruke en murstein til

Tilgjengelig tid 5 minutter

(Name all the different ways you can use a brick)

 3. Skriv opp problemer vi kan ha i år 2005, som folk ikke hadde for 50-100 år siden.

Tilgjengelig tid 5 minutter

(Name all the problems you can think of that we did not have 50 years ago)

2) Basadur measure

Answer each with one of the following:

a = totally DISAGREE

b = mostly disagree

c = neutral

d = mostly agree

e = totally AGREE

1. I feel that people at work ought to be encouraged to share all their ideas, because you never know when a crazy-sounding one might turn out to be best.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

2. One new idea is worth ten old ones.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

3. I like to listen to other people's crazy ideas since even the wackiest often leads to the best solution.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

4. I should do some prejudgment of my ideas before telling them to others.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

5. We should cut off ideas when they get ridiculous and get on with it.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

6. I feel that all ideas should be given equal time and listened to with an open mind regardless of how zany they seem to be.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

7. The best way to generate new ideas is to listen to others then tailgate or add on.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

8. Quality is a lot more important than quantity in generating ideas.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

9. A group must be focused and on track to produce worthwhile ideas.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

10. Lost of time can be wasted on wild ideas.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

11. Judgment is necessary during idea generation to ensure that only quality ideas are developed.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

12. You need to be able to recognize and eliminate wild ideas during idea generation.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

13. I think everyone should say whatever pops into their head whenever possible.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

14. I wish people would think about whether or not an idea is practical before they open their mouth.

a (totally DISAGREE) **b** (mostly disagree) **c** (neutral) **d** (mostly agree) **e** (totally AGREE)

3) Evalueringsskjema/ evaluative tasks

På de følgende tre sidene vil det bli presentert en rekke ideer fra de forskjellige divergent thinking-oppgavene dere fikk ved forrige samling. Dere skal nå sette karakter/ score på disse ideene (mellom 1 og 7). Gi høye tall (6 og 7) til de mest kreative ideene og gi lav score (1 og 2) til de minst kreative ideene. Gi de midterste tallene (3,4 og 5) til de ideene som bare er litt kreative. Prøv å bruke hele skalaen og rate en side av gangen, ikke bla tilbake.

Sterke ting

Ideer:	Karakter/ Score (fra 1 til 7):
Opplevelser	
Alkohol	
Lut	
Plumbo	
Karisma	
Kjærlighet	
Tarzan	
Tau	
Stål	
Sol	
Naturkrefter	
Kroppsbgger	
Kommunikasjon	
Livet	
Vilje	
Mat	
Storm	
Tro	
Kryptonitt	
Wire	
Personlighet	
Chili	
Reaksjoner	
Traktor	

Bruksområder for en murstein

Ideer:	Karakter/ score (fra 1 - 7)
Bokstøtte	
Kunst	
Bremsekloss	
Bygge kirke	
Slå	
Bygge mur	
Lysestake	
Dørstopper	
Kaste	
Tyngde	
Bygge grill	
Bygge bar	
Knekke nøtter	
Gryteunderlag	
Lodd	
Bygge peis	
Brolegging	
Samtalepartner	
Stable	
Stå på	
Mosaikk	
Knuse	
Dominobrikker	
Leke	

Problemer i 2005 som vi ikke hadde for 50 eller 100 år siden

Ideer	Karakter/ score (fra 1 til 7)
Oljefondet	
Mosjon	
Databriller	
Motepress	
Informasjon	
Parkering	
Skillsmisse	
Terror	
Krangel om fjernkontrollen	
Miljø	
Karrierejag	
Teknisk	
For mange utenlandske spillere på Brann	
Tid	
Sykdommer	
Bensinpris	
Barnepass	
Likestilling	
Familie	
Alderdom	
Tatt i promilletest	
Overvåking	
Data	
Jobbtrivsel	

4) Demografiske variabler/ Demographic Variables

Kjønn: _____

Alder: _____

Utdannelse/ tittel/ skole _____

Utdanningslengde i år _____

Arbeidsgiver _____

År I nåværende stilling _____

År arbeidserfaring totalt _____

Nåværende stilling _____

Gjennomsnittskarakter videregående skole _____

Har du lederansvar i din nåværende stilling? Ja/ Nei

Har du hatt lederansvar i tidligere stilling? Ja/ Nei

Antall år ledererfaring _____