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Selart, Marcus; Johansen, Svein Tvedt

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Understanding the Role of Value-Focused Thinking in Idea Management

Marcus Selart and Svein Tvedt Johansen

In a couple of classical studies, Keeney proposed two sets of variables labelled as value-focused thinking (VFT) and alternative-focused thinking (AFT). Value-focused thinking (VFT), he argued, is a creative method that centres on the different decision objectives and how as many alternatives as possible may be generated from them. Alternative-focused thinking (AFT), on the other hand, is a method in which the decision maker takes notice of all the available alternatives and then makes a choice that seems to fit the problem best. The impact of these two methods on idea generation was measured using a sample of employees. The results revealed that employees in the value-focused thinking condition (VFT) produced fewer ideas. Thus, value-focused thinking (VFT) is not only able to facilitate ideation fluency but also to constrain it. Factors such as cognitive effort and motivation may play a part here. However, the quality of the ideas was judged to be higher in terms of creativity and innovativeness. Hence, value-focused thinking (VFT) seems to have a positive impact on the quality of ideas in terms of creativity and innovativeness regardless of ideation fluency. Implications for the design of idea management systems are discussed.

Introduction

It has been argued that the mean number of ideas produced by employees constitutes the most important criterion for the organization's capacity to manage its ideas (Robinson & Schroeder, 2004). Firms that take ideas seriously, take their employees' thinking seriously. Ideas are the life force of corporations, they say, and managers who recognize this can increase profits and avoid budget cuts and layoffs. Thus, corporate idea programmes are vital for organizations all the way from inspiration to implementation. It is important to keep in mind that small ideas, leading to continuous, incremental improvement, often are as valuable as large ones. It follows that both quantitative as well as qualitative dimensions of idea generation are important aspects of idea management. Recent research suggests that there are four components that govern the quality of the best ideas: (1) the average quality of ideas generated, (2) the number of ideas generated, (3) the variance in the quality of ideas generated and (4) the ability of the group to discern the quality of the ideas (Girotra, Terwiesch & Ulrich, 2010).

The present study looks at the effects of two different thinking styles that employees are likely to use when engaged in the production of ideas: value-focused thinking (VFT) and alternative-focused thinking (AFT) (Keeney, 1992, 1994). Both have the potential to trigger the production of ideas among individuals. For idea management systems to function optimally, they require a rich influx of ideas. The study also looks at the quality of these ideas since this is also an important issue for the systems.

In the remainder of the paper, we first describe the different thinking styles, before proceeding to look at how they influence idea generation and quality. In the next section, we introduce and report the findings from an empirical study in a larger organization. The last section discusses findings and

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identifies the limitations on directions for future research.

A Traditional View of Individual Decision Making

The traditional view of individual decision making implies that a choice between a set of different alternatives has to be made, or more specifically, a process that enables a choice between different possible actions (Slade, 1994; Proctor, 1999; Reiter-Palmon & Illies, 2004; Osburn & Mumford, 2006). Making decisions thus to a large part involves accessing and systematizing information and thereafter analysing and interpreting it before a choice between alternatives can be made. For this reason, it is only natural to view decision making as part of a creative problem-solving process. However, it must be noticed that most problems do not only have one perfect solution. Hence, it may seem impossible to find the optimal solution. Instead, something must always be traded off in order to find the alternative that best satisfies the objectives one wants to achieve by solving the problem (Slade, 1994; Proctor, 1999; Reiter-Palmon & Illies, 2004; Osburn & Mumford, 2006). The problem solver begins by identifying the problem by establishing what kind of problem he or she has to deal with and which objectives will be achieved by solving it. Subsequently, all possible alternatives are identified. In many cases, well-known solutions are at hand, and the decision maker often feels a temptation to use such a solution in order to solve the problem in a simple way. This implies that the search for the optimal solution in many cases is abruptly abandoned. Instead, the problem solver should try to define as many alternatives as possible and clarify what objectives may be reached by each of them. Then, the best alternative should be chosen and implemented. If it is impossible to find a satisfying alternative to the problem, it is the task of the decision maker to ensure that this does not occur.

Creative problem solving typically involves redefining problems to accommodate new perspectives as well as solutions. Problems should be explored thoroughly and search areas remain open as long as possible. Premature closure may cause decision makers to overlook vital aspects of the problem (Slade, 1994; Proctor, 1999; Reiter-Palmon & Illies, 2004; Osburn & Mumford, 2006). According to Visscher and Fisscher (2009), divergence and convergence are important elements of most organizational decision processes. Therefore, a key question is whether decision makers first develop the alternatives and then choose the best one.

The Effects of Objectives on the Decision-Making Process: Generating Values versus Alternatives

It has been suggested that the number of possible solutions to a problem that a decision maker deals with in the process is indicative of problem-solving quality (Reither & Stäudel, 1985). The rationale is that a problem solver who produces many solutions normally takes into account more operations in order to obtain his or her objectives. Such a person is likely to find suitable strategies faster and is more persistent in using them. For these reasons, such a person is more likely to generate both more and different solutions. He or she is also keener to discover the proper objectives in the initial part of the process, and more driven to find new and relevant information. In addition, such a person is also more self-reflective in connection with what is done. Generally, such a person is not stuck in the details and manages to grasp the whole picture quite well (Slade, 1994; Proctor, 1999; Reiter-Palmon & Illies, 2004; Osburn & Mumford, 2006). In line with this, Mednick (1962), as well as Wallach and Kogan (1965), believe that employees capable of producing a larger number of associations could also stand a better chance of producing unique solutions (see also Osborn, 1953). Wallach (1970) suggested that the generation of associations is influenced by how people deploy their attention. For instance, creative employees can attend to many aspects of a given stimulus and thus produce a large number of varied associations (see Brown, 1989). It has also been suggested that a blind or chance variation among knowledge elements produces creative ideas (Campbell, 1960) (see Stoycheva & Lubart, 2001, for a review).

This very forceful potential of goals and objectives has been documented by many researchers (e.g., Etzioni, 1971; Kleinbeck & Schmidt, 1990; Locke & Latham, 1990a, 1990b; Wood & Locke, 1990). In addition, decision alternatives often include an emphasis on involvement, especially at the beginning of the process (Verplanken & Svenson, 1997). According to Laurent and Kapferer (1985) there are essentially four factors that affect involvement in the decision process: self-image, perceived risk, social acceptance and hedonistic influences. Goals and objectives seem to be related to them all.

Taking this reasoning into account, Keeney (1992, 1994) made a distinction between two different methods that can be used when entering a decision situation. He refers to these as *alternative-focused thinking* (AFT) and *value-focused thinking* (VFT). It is stated that alternative-focused thinking is the most commonly used method and that it has a lot in common with the traditional method. The process is that initially, the problem is identified. Subsequently, the decision maker takes notice of all the available alternatives and then makes a choice that seems to fit the problem best. Most often, new alternatives that have not been tested before are not included in the process. According to Keeney, this method involves perceiving the decision process as more of a problem than as an opportunity to create something new. Most people are accustomed to this method and have been trained in it since their childhood. Making choices between different visible alternatives is something we have to engage in right from early childhood.

In contrast, value-focused thinking is a more creative method since it focuses on the different decision objectives and how as many alternatives as possible may be generated from them. At an early stage in the process, the centre of attention is set on objectives, intentions, desired results and decision advantages, and the decision maker tries to explore unknown solutions to the problem. It is argued that this point of departure makes it easier to achieve the desired consequences of the decision (see also Arvai, Gregory & McDaniels, 2001; Johnson & Raab, 2003; Brugha, 2004; Bond, Carlson & Keeney, 2008, 2010). Factors such as motivation, involvement, confidence and knowledge all play a part in such a process (e.g., Boden, 1994; Amabile, 1996; Weisberg, 1999). By using value-focused thinking, one starts with the best potential outcome and then works really hard to achieve it. On the other hand, by using alternative-focused thinking, one starts with the available alternatives and then tries to make the best choice out of this material. This implies that value-focused thinking demands a great deal more cognitive effort, since if used, the method requires that we think thoroughly through what we really want to achieve by the decision. If we succeed in this, we generally have access to more and better solutions from which to choose. In conclusion, it may be stated that value-focused thinking has the following advantages when compared with alternative-focused thinking:

(a) it includes more innovative alternatives;
(b) it generates a broader distribution of alternatives;
(c) it includes the future consequences of a decision to a higher degree; and
(d) it involves more desirable consequences of a decision.

In an important study by León (1999), the differences between alternative-focused and value-focused thinking have been empirically explored. The general finding was that when value-focused thinking is used, it covers more aspects of a problem than alternative-focused thinking. In the study, participants in a value-focused thinking condition were instructed to define all possible kinds of objectives that should be met by solving a particular problem and to also indicate a variety of possible solutions. Participants in the alternative-focused thinking condition were instructed to begin with generating possible solutions and to subsequently indicate different objectives. It was found that both the number of generated alternatives as well as the contextual variety were greater when value-focused thinking was applied. The study thus confirmed that, in a narrow sense, value-focused thinking was a more innovative method than alternative-focused thinking. It is also noted that many constraints that are involved in a decision situation are unnecessary and may be removed in order to create more alternatives. Such constraints may consist of previously arranged rewards/incentives, deadline-induced pressures, expected evaluations or monitoring (Amabile, 1983). In this type of process, attention to different subsets of an attribute may sometimes also result in the creation of options (for illustrations, see Pitz, Sachs & Heerboth, 1980; von Winterfeldt, 1980; Jungermann, von Ulardt & Hausmann, 1983; Keller & Ho, 1988). This is because our associative memory permits small cues or attributes to stimulate the retrieval of complex associations. These may in turn have a bearing on the option-generating process. Another way of creating options is to apply creativity heuristics to the decision situation in order to release constraint-free thinking.

A related study has been published by Gettys et al. (1987) focusing on individual decision-making performance. In the study, participants were instructed to generate as many solutions to a problem as possible on a piece of paper. The problem lacked a clear structure and explicit objectives. The solutions that were produced by the participants were not bad, but far from complete in their nature. Since many aspects were ignored, Gettys et al. came to the conclusion that the single decision maker is incapable of taking all aspects into account when he or she is engaged in solving a problem that does not possess any objective.

In a classical study by Harrington (1975), one group of subjects was instructed to produce novel solutions to a problem whereas another group was instructed to produce as many solutions as possible to the problem. It was found that the quality of the ideas in terms of creativity and innovativeness was higher in the group that received the qualitative instructions (see also Runco & Okuda, 1991; O'Hara & Sternberg, 2000; Runco, Illies & Eisenman, 2005; Runco, Dow & Smith, 2006).

It is thus important to note that numerous alternatives – by themselves – do not guarantee creative alternatives (see Pitz, Sachs & Heerboth, 1980; Fischhoff, 1983; Isenberg, 1986; Gettys et al., 1987; Keller & Ho, 1988). Concentrating too hard on a specific objective might also be harmful in the sense that if you always know where you are going, you may never end up anywhere else. It is always possible that some other place would have been preferable, but you just did not know about it. Creative decision making should thus be a process for discovering goals as well as for achieving them. In other words, you should be goal-guided and not goal-governed (Gelatt, 1991). Similarly, it has been found that the beneficial effects of values (to provide meaning, energize and regulate value-congruent behaviour) are contingent on values being cognitively activated as well as central to the self (Verplanken & Holland, 2002).

Based on the above we present our hypotheses:

H1: Decision makers who use value-focused thinking (VFT) will create more alternatives than those who use alternative-focused thinking (AFT).

H2: Decision makers who use value-focused thinking (VFT) will create alternatives that are judged as having a higher quality than those who use alternative-focused thinking (AFT).

Method

Participants

Seventy HR employees participated in the study. Participants were randomly recruited from a human resources management department of a large organization in Sweden. All relevant HR professions were represented in the sample. Five employees did not complete the investigation. Of the remaining 65 employees, there were 29 males (45%) and 36 females (55%). Fifteen employees held managerial positions.

In recent years, the nature of the work of HR professionals has changed significantly. The competition to recruit and maintain the best human resources has become increasingly warlike. From this perspective, the generation of creative ideas of how to make one's own organization appear as attractive as possible has become imperative among HR professionals.

Material

A booklet was created especially for this study, sub-divided into two separate parts. The first part included nine questions focusing on how well the employees were acquainted with the goals of the organization, and to what extent the employees felt that they were driven by objectives. A Likert scale including three levels was attached to each item. Scores were distributed along the following lines: (1) = a low degree of experienced objectives' governance; (2) = a moderate degree of experienced objectives' governance, and (3) = a high degree of experienced objectives' governance. In addition to these items, questions were also asked about age, gender, education and position in the organization.

The second part of the booklet consisted of a problem-solving task that was ecologically designed to fit organizational change issues that were key to most employees at the time of the data collection. The employees were asked to make suggestions about how a minor amount of money (20,000 Swedish Crowns) could be saved by the organization during the forthcoming budgetary year. They were randomly distributed to either of two conditions that differed with regard to the method the participants were instructed to use in order to solve the problem presented. In the first condition, the employees were instructed to use AFT while in the second one they were prompted to apply VFT (see Appendices I and II). The distribution of employees to the two conditions was stratified with regard to gender and experienced objectives' governance (high or low, depending on to what extent the aggregated individual scores were able to transcend a pre-established threshold).

The main difference between the conditions was that employees in the value-focused conditions were equipped with a set of gains and objectives that they would be able to obtain if they were successful in the resolution of the task (see also León, 1999). The employees in the alternative-focused condition were not equipped with such gains and objectives. Otherwise, the conditions were designed to be the same. It must be noted that León, in his study, let participants create their own objectives. However, due to mainly practical difficulties, we were not able to follow this procedure. It has been found by Bond, Carlson and Keeney

(2008) that decision makers are constantly deficient in utilizing personal knowledge and values to form objectives for the decisions they face.

In line with the recommendations made by Gettys et al. (1987), only one major task was applied in each condition. The reason is that creativity, and thereby the amount of solutions presented, will increase as a function of participants concentrating on one major task.

Procedure

The data collection took place at the two sites/workplaces addressed in the study. The management helped in recruiting voluntary employees. The duration of the experiment was restricted to 40 minutes for practical reasons and to avoid fatigue. Generally, the data collection occurred before lunch in connection with an ordinary meeting that was on the agenda. At the beginning of the experiment the general purpose of the study was presented in a way that did not jeopardize the experiment. The participants were informed that the analyses were to be carried out on de-individualized data and that they were free to cancel their participation at any time. Following the completion of the first part of the study, a short break was introduced, in which participants were assigned to the two experimental conditions. After the break, the two versions of the task were administered to the employees, who were instructed to produce as *many* and as *brief* solutions as possible to the problem.

Results

To address our first hypothesis, the amount of solutions produced by each individual was counted and noted. A two-way ANOVA, with problem-solving condition (2) and objectives' governance (2) as the two independent variables and number of solutions produced as the dependent variable, was carried out. It revealed a reliable main effect of problem-solving condition, F (1, 63) = 6.01; $p < 0.05$. As shown in Table 1, employees in the alternative-focused thinking (AFT) condition produced significantly more solutions than employees in the value-focused thinking (VFT) group. There was neither a reliable main effect of objectives' governance observed nor was there a significant interaction between the two independent variables.

In agreement with our second hypothesis, qualitative differences between the solutions generated in each group could be observed (see Table 2). Solutions generated in the AFT group were focused to a large extent on cost effectiveness and new ways of how to raise money, whereas solutions that were derived from the VFT group had a more long-term and visionary approach. Employees engaged in the VFT group were quite concerned about issues such as quality improvements and work motivation when producing their solutions. In a sense, their solutions appeared more innovative and insightful, and omitted the most obvious solutions.

We then rated each idea produced with regard to its innovativeness on a five-point Likert scale. The end points were defined as not very innovative (1) and very much innovative (5). The mid-point of the scale was defined as moderately innovative (3). A procedure was used so that while rating, it was impossible to connect the ideas to the experimental

Table 1. Means and Standard Deviations for the Number of Generated Solutions by Conditions

Technique	Goal directedness	*N*	Mean	SD
AFT	Low	14	18.86	2.37
	High	19	16.32	2.04
VFT	Low	18	12.06	2.09
	High	14	12.21	2.37

AFT = Alternative-Focused Thinking, VFT = Value-Focused Thinking.

Table 2. Examples of Solutions Provided by Employees of the two Conditions

Alternative-Focused Thinking (AFT)
- Reduce unnecessary personnel costs
- Expand voluntary work by the personnel
- Introduce more fees
- Reduce benefits to personnel
- Increase the outsourcing of own personnel to other organizations
- Make the personnel become more active in creating savings to the own organization

Value-Focused Thinking (VFT)
- Increase the number of personnel investigations
- Increase planning
- Increase the competence of the personnel
- Increase leadership quality
- Focus on creativity and enthusiasm
- Expand personnel health programmes

condition to which the employee had belonged. Interestingly, the ideas produced by the employees belonging to the VFT group received a significantly higher mean value than those produced by the AFT group ($M = 4.38$ vs. $M = 3.42$), $p < 0.05$. Using an independent rater, we found that the inter-coder reliablity of our codings summed up to $\kappa = 0.79$ (Cohen's kappa) which is considered acceptable.

Discussion

The present study investigated the relationship between value-focused thinking (VFT) and the production of solution alternatives or ideas. It also focused on the quality of these ideas. The study showed that VFT in itself is not a sufficient condition for the rich production of solutions or ideas, as has been suggested by Keeney (1992, 1994). The explanation could be that decision makers generally are more effective when using techniques that they have long been accustomed to in their everyday lives (Payne, Bettman & Johnson, 1992; Bettman, Luce & Payne, 1998; Denstadli & Lines, 2007). It may be assumed that such methods are applied to a large extent automatically in order to keep the cognitive effort to a minimum. This type of process has been coined the 'path-of-least-resistance', where the default approach in creative tasks is to implement the first solution that comes to mind, either based on a previous solution or a category exemplar (Barsalou, 1991; Ward, 1994; Page Moreau & Dahl, 2005). Moreover, new and unfamiliar methods might require more cognitive effort and result in a lower degree of decision effectiveness and productivity.

It has been mentioned by Keeney (1992, 1994) that people in general are trained in how to use AFT when they are quite young. This may explain why the participants under the AFT condition managed to create many different solutions to the problem. Many of these solutions were characterized by a high degree of accessibility, in the sense that they came easily to mind and were well known among participants. According to Keeney (1992, 1994), the choice of a well-known solution is more or less equal to the application of AFT. This reasoning is in line with the ideas presented by Slade (1994). He stated that the choice of a well-known solution implies that people do not move on in the decision-making process to the stage where new alternatives are generated. Hence, the employees under the AFT condition used a well-known pattern that was not especially time-consuming. For this reason, they were able to generate more alternatives. However, it has been revealed by Plucker, Runco and Lim (2006) that idea fluency will sometimes increase at the same time as originality suffers. Many of the ideas contributing to fluency may be unoriginal because they are just drawn from memory.

On the other hand, the employees from the VFT condition received a task that was completely new to them and it took some time for them to get acquainted with the method. It is common knowledge that creative problem solving implies a reformulation of the problem and that new perspectives become visible as a result. It could have been the case that the employees under the VFT condition were reformulating the problem to a high extent and therefore did not have time to demonstrate the well-known solutions. Put differently, the employees under the VFT condition were not provided with a sufficient amount of time in order to accomplish all the stages of the process.

Building on the theory presented by Keeney (1992, 1994), VFT implies that the decision maker starts by taking different objectives or preferred results into account that might be achieved by the decision (see also Arvai, Gregory & McDaniels, 2001; Johnson & Raab, 2003; Brugha, 2004; Bond, Carlson & Keeney, 2008, 2010). By using VFT one starts with the best potential outcome and then one works really hard to achieve it. For this reason, playful, experimental, explanatory thinking that so often characterizes truly creative thinking may sometimes be constrained (Visscher & Fisscher, 2009). In fact, VFT may sometimes be potentially more convergent than divergent to the disadvantage of idea fluency (see also psycho-economic theory as described by Rubenson & Runco, 1992). This type of thinking involves novel mental operations that are likely to impose greater demands on peoples' information processing capacity than AFT does. The latter to a greater extent relies on a series of well-learnt, semi-automatic cognitive operations that can be sustained even with low interest and low mental effort (Visscher & Fisscher, 2009).

Involvement and motivation are likely to have two effects, both of which will promote the generation of alternatives. First, these capabilities are likely to increase peoples' willingness to expend effort on information processing. For VFT, we might expect a threshold effect in which this type of thinking outperforms AFT above a specific threshold of involvement and motivation. We could also speak of a Gestalt shift between convergent and divergent thinking driven by involvement and motivation. Below this level, the more robust AFT reigns supreme with regard to ide-

ation fluency. However, above this level, by allowing for more creative, associative processes, VFT outperforms AFT in this respect.

Still, with regard to the adjudged quality of the ideas presented, VFT seems to be superior to AFT even in situations where ideation fluency is inferior. The results of our qualitative analysis revealed that the ideas presented by the employees belonging to the VFT condition were judged as being more innovative and insightful in that they were more long term and visionary. These findings are in line with Kasof et al. (2007) as well as Joy (2004) who found that creative behaviour is fostered by certain value types. They also supported the findings of Ward, Patterson and Sifonis (2004) suggesting that abstract value-based formulations often lead to more novelty than specific ones do.

Numerous ideas do not necessarily translate into better ideas or more creative ideas (see Pitz, Sachs & Heerboth, 1980; Fischhoff, 1983; Isenberg, 1986; Gettys et al., 1987; Keller & Ho, 1988). For instance, it has been suggested that the process of generating novel ideas is not completely random (Simonton, 1988). Certain lines of thought must be considered more probable than others due to the content matter involved and characteristics of an employee's knowledge base (see also Girotra, Terwiesch & Ulrich, 2010, for a recent discussion).

Practical Implications

According to Robinson and Schroeder (2004), large numbers of ideas allow an organization to reach levels of performance that are otherwise unachievable. Without them, it is impossible to attain excellence. Ideas are an important tool for organizational learning. The ability to tap into them moves an organization onto a faster learning curve. However, there is also a handling cost associated with the amount of ideas created. A problem can also arise if the strategic focus is on increasing the amount of ideas and not on the quality of these ideas. Hence, idea management systems need to undergo constant revisions and improvements.

As mentioned earlier, this includes the supervision and control of the number of ideas produced by individual employees over a given time period (Robinson & Schroeder, 2004). Most employees already have lots of ideas, want to share them and would be thrilled to see them used. They feel pride in their work and like to contribute to their organizations' success. For them, the best reward is to see their ideas used (Robinson & Schroeder, 2004; Sundgren et al., 2005). Thus, idea management systems should be designed to foster motivation. This may mean designing idea management systems that will maximize organizational members' experience of control and autonomy in the process (Greenberger & Strasser, 1991).

Another important aspect of idea management systems is that they place systems and processes to implement a 'stage-gate' or idea funnel process where ideas are systematically filtered and assessed against criteria. Only the most valuable ones are implemented and put into practice. Here, we see a great potential for VFT. Even if values might have a constraining effect on ideation fluency, our results clearly demonstrate that they have a positive effect on idea quality. Thus, these ideas have a greater potential to meet the criteria used for evaluation in idea management systems. In this context, VFT offers a great opportunity, which to a large extent has been neglected by practitioners (Girotra, Terwiesch & Ulrich, 2010). It may be the case that the capability of this kind of thinking has been overestimated in connection to idea fluency (Keeney, 1992, 1994) and underestimated with regard to the stimulation of high-quality ideas.

Limitations

A weakness of our study is that we only used one task. According to psychometric theory, questions about our manipulation may therefore be raised. By using just one task, we implicitly made the assumption that all employees saw equal importance in the task and this was, of course, not the case. The critical question can thus be raised whether an employee can engage in VFT if the task is not perceived as interesting. If we had applied a battery of tasks and not just relied on one task, the error variance would have been minimized.

However, for practical reasons, it is not possible to live up to the standards set by psychometric theory in most of the research conducted outside the laboratory. Thus, it is much more common to find published studies with a one-task approach in areas such as organizational behaviour and human resource management than in experimental psychology. As an example, the study by Gettys et al. (1987) referred to earlier relied on only one task. We believe that the task used in the present study (asking employees to generate cost-cutting ideas for their organization) has a high degree of ecological validity. This means that it is a task that is of central importance to many organizations. However, we are fully aware of the limitations that this approach has for the interpretation of our results. It is thus perfectly possible that the use of VFT in other

types of tasks may have lead to a higher degree of ideation fluency. In addition, the quality of those ideas in terms of creativity and innovativeness might have been different. To sum up, the results of the present study can only disprove the conjecture that VFT stimulates idea fluency to a higher degree than AFT. The results also disprove the notion that a lower degree of ideation fluency necessarily will lead to a lower degree of creativity and innovativeness.

Future Research

We suggest that future research should take into account how psychological factors such as motivation contribute to the improvement of systematized idea generation. In this connection, it is of special interest to concentrate on VFT (Keeney, 1992, 1994) as the key thinking style. VFT has a greater potential to trigger creative ideas (León, 1999). However, certain preconditions must be met for VFT to realize its potential. The present research suggests that motivation constitutes one important precondition. Future research should describe and explain these preconditions (motivation as well as others) in more detail, as well as look at how different preconditions relate to each other within a nomological network.

As stated at the beginning of this paper, ideas are often developed in idea management systems and within an organizational context. More research is needed on how the design of such systems can foster idea generation. New studies should be designed to explore how the design of such systems can help develop experiences of motivation. Possible parameters here could include the effects of such systems on organizational members' experience of control and autonomy – variables that in turn might help create an experience of motivation (Greenberger & Strasser, 1991; Girotra, Terwiesch & Ulrich, 2010).

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Marcus Selart (Marcus.Selart@nhh.no) is Professor of Organizational Behavior at the Norwegian School of Economics (NHH). He is the author and co-author of several books and research articles on judgment, motivation, and creativity within a business context.

Svein Tvedt Johansen is Associate Professor of Organizational Psychology at Harstad University College where he also acts as Prorector. He is interested in social psychological issues within a business context.

Appendix I. Instruction Given to Employees Belonging to the Alternative-Focused Thinking (AFT) Condition

Your task is to write down on paper as many solutions as possible. You need only to present your solutions in short statements without any further explanations. You have 40 minutes at your disposal in order to solve the task. Good Luck!

At your workplace, you have recently been informed that you need to cut down on expenses by £1,500 during the forthcoming year. A board of local politicians has asked for help from you and your colleagues in this connection. They want you to write down as many solutions as possible to this problem on an individual basis. You do not need to come up with 'the perfect solution'. It often happens that the best solutions can be traced to ideas that seemed ridiculous at the initial stage when they were presented. You don't have to think about how the solutions should be implemented from a practical point of view. The process that you will be involved in is sometimes referred to as 'brainstorming', which implies that you write down all suggestions that come to your mind. At this stage, all suggestions are welcome, which implies that you should not involve yourself in any judgement about whether the solutions are good or bad. It is the number of produced alternatives that matters. Please do not give up too early. The politicians have promised to reward the employee that comes up with the greatest number of solutions.

Appendix II. Instruction Given to Employees Belonging to the Value-Focused Thinking (VFT) Condition

Your task is to write down on paper as many solutions as possible. You need only to present your solutions in short statements without any further explanations. You have 40 minutes at your disposal in order to solve the task. Good Luck!

At your work place, you have recently been informed that you need to cut down on expenses by £1,500 during the forthcoming year. A board of local politicians has asked for help from you and your colleagues in this connection. They want you to write down as many solutions as possible to this problem on an individual basis. You do not need to come up with 'the perfect solution'. It often happens that the best solutions can be traced to ideas that seemed ridiculous at the initial stage when they were presented. You don't have to think about how the solutions should be implemented from a practical point of view. The process that you will be involved in is sometimes referred to as 'brainstorming', which implies that you put down all suggestions that come to your mind. At this stage, all suggestions are welcome, which implies that you should

Appendix II. *Continued*

not involve yourself in any judgement about whether the solutions are good or bad. It is the number of produced alternatives that matters. Please do not give up too early. The politicians have promised to reward the employee that comes up with the greatest number of solutions.

Goals to be achieved as suggested by the politicians:

- The budget needs to be balanced, since an overdraft facility has been required in recent years (not to the amount of £1,500)
- The priorities of the different activities must be overlooked and may be subject to change
- The resources must be concentrated in a few areas in order to improve these
- Employees need to be aware that resources are scarce in order for them to economize better
- The idealism and motivation of the employees must be maintained
- The organization must become more effective and flexible
- A better creative climate in the workplace must be established