How Do Aspiration Levels Come About?

Bounded Rationality and Dynamic Search

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ABSTRACT

Although the Behavioral Theory of the Firm has served as continuing stimulus in diverse field of inquiry such as organizational learning, the theory of the firm, and decision making research more generally and there is good reason to expect that this influence continues to remain significant, the reach of the theory as it stands in situation of genuine uncertainty remains limited. This paper seeks to address this gap by taking steps towards extending the theory of search. A key departure from earlier approaches to the theory of search is the inclusion of the question "How do aspiration levels come about?" in addition to the received question "How do aspiration levels change." This approach highlights the significance of an extended model of search in situations of Knightian uncertainty and Shacklian surprise. For instance, the concept of dynamic search sheds light on the role of 1) experimentation and play in the creation of aspirations, 2) creating disbelief in situations of lacking prior experience, and 3) disengaging limits of imagination. This paper develops aspects of the theoretical foundations of the concept of dynamic search and clarifies processes leading to new aspirations that guide subsequently firm adaptation. While many implications of dynamic search are still unexplored, building on insights from specifically the economists Shackle, Knight and the recent work of March and more generally from the 'bounded rationality' - tradition appears to be a promising avenue for new advances in organization science.

1. Introduction

The behavioral theory of the firm (Cyert and March, 1963) has been among the most inspiring fields in economics and management research. Although is has served as continuing stimulus in diverse field of inquiry such as organizational learning, the theory of the firm, and decision making research more generally and there is good reason to expect that this influence continues to remain significant, the reach of the theory as it stands in situation of genuine uncertainty remains limited. Yet, many companies (e.g. biotech, software, high-tech engineering, media) find themselves in competitive situations signified by hyper-competition (D'Aveni, 1994), high velocity environments (Eisenhardt, 1997), or rugged landscapes (Kauffmann, 1995; Levinthal, 1997). Such situation have been variously described by high degrees of creative destruction, competing technological trajectories, low general agreement among potential players on standards, fast shifting alliances, and changing network formations across traditional industry boundaries. These environmental conditions result in a high degree of managerial ignorance and uncertainty, competitive surprise, as well as indeterminate and non-probabilistic future outcomes in the evolutionary development of competitive spaces.

These conditions pose a challenge for the firm's adaptation and survival in that such situation are signified by a lack of relevant prior experience, confusion, lack of orientation, and consequently a lack of clear aspiration that could guide adaptive firm behavior. As a departure from earlier approaches to the concept of search within the behavioral theory of the firm in which the existence of aspiration levels is assumed, the concept of dynamic search advocates the inclusion of the question "How do aspiration levels come about?" in addition to the received question "How do aspiration levels change." While the argument of the paper takes its departure from the tenets of the "Behavioral Theory of the Firm" (Cyert & March, 1963) and shares the concern with economic processes under conditions of bounded rationality, imperfect environmental matching and adaptation, it is specifically interested in *complications* associated with search in situations of genuine uncertainty.

This paper supports the recent call of Radner (1996) who suggests to refocus attention on "bounded rationality" as the crux for the theory of organization and recommends future research on the notion of "truly bounded rationality" as a step towards incorporating genuine uncertainty in explaining organizational adaptation. This kind of uncertainty does not only concern environmental complexity, but additionally and equally important endogenous-subjective factors, such as divergent judgment, time perception, and lack of prior experience. Therefore, this paper asks: what are the implications for organizational adaptation, search, and aspirations in organizations taking this kind of uncertainty literally? We suggest to reconsider the notion of bounded rationality by extending it beyond the aspect of limited computational human capacity toward limited imagination in situation of genuine uncertainty.

While most literature has tended to focus on environmental complexity that, given the limitations of the agents cognitive competence in coping with this complexity, leads to uncertainty (e.g. Thompson, 1967; Lawrence and Lorsch, 1967), the concept of dynamic search incorporates additionally the endogeneity of preferences (March, 1994) and the endogeneity of ignorance (Loasby, 1976) as crucial to genuine uncertainty. We address implications for a theory of search in situations of lacking prior experience and lacking initial aspiration-levels which could guide the firm's adaptation. Moreover, stressing dynamic search suggests to ask: When genuine uncertainty requires judgment and human problem solving needs prior problem-finding, while simultaneously there is a lack of prior experience, what processes, then, lead to *new* aspirations?

The remainder of the paper is organized as follows. Section two discusses the foundation of the concept of dynamic search and presents a concept definition. Section three suggests processes associated with dynamic search. This facilitates the investigation of a variety of problems associated with dynamic search such as prior knowledge, ignorance, and the subjectivity of real-time in multi-person setting. In section four, we summarize the paper and conclude with implications for promising areas of future research.

2. Dynamic Search I: Foundation

The concept of dynamic search builds on three previously largely unrelated but complementary useful streams of literature. First, we briefly summarize the theory of search in the behavioral theory of the firm as a point of departure. This theory is acknowledged as an antecedence to the concept of dynamic search. Secondly, we clarify with Knight (1921) and Shackle (1961, 1966, 1979) the notion of genuine uncertainty and distinguish it from risk. Thirdly, we discuss situations of genuine uncertainty in relation to surprise and imagination to provide the foundation of the concept of dynamic search. Finally, we suggest a working definition for dynamic search.

2.1 Antecedence: Search and Adaptation in the Behavioral Theory of the Firm

The behavioral theory of the firm suggests to conceptualize the firm as adaptive political coalition (March, 1962; Cyert & March, 1963); a coalition between different individuals and groups of individuals in the firm each having different goals and hence, there is the possibility of conflicting interests. Centrally, the firm is seen as an adaptive system which, through learning and experimentation, adapts to its environment. The experience of the firm is embodied in a number of "standard operating procedures"; procedures for solutions to problems, which the firm in the past has managed to solve. As time pass by and experience change, so do standard operating procedures through processes of organizational search and learning. The firm is, in other words, not a static entity – it is a dynamic system of rules, where search is triggered and driven by present levels of aspiration in conjunction with deviations of actual outcomes from that aspirations.[1] In particular, two aspects of the behavioral theory of the firm are of importance for an understanding of the firm's adaptation: (1) the recognition that humans are boundedly rational, and (2) the theory of search.

2.1.1 Aspirations and Search

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[1] This view of the firm is, of course, different from other modern theories of the firm (such as transaction cost theory or evolutionary theory). However, there are also a number of important similarities: The concept of bounded rationality is now standard in the transaction cost theory of especially Oliver Williamson (e.g. 1985); elements of the thoughts of the firm as an adaptive political coalition can be found in game-theoretical theories of teams (Marschak & Radner, 1972); conflict of interest is most commonly assumed in transaction cost theory, and the view of the firm as being a system of rules which adapt to its changing environment is, of course, important in the evolutionary theory put forward by especially Richard Nelson and Sidney Winter (1982).

Central to the firm's adaptation are processes of search that revolve around aspiration levels. Aspiration levels serve the function of guiding agents with only limited cognitive capacity towards action in representing the imagined potential gains and losses, and constituting what motivates action and decisions. That is, aspiration levels are strongly influenced by the past and by comparisons between present and past. Thus,

"[t]he history is important because aspiration levels – the dividing line between good enough and not good enough – are not stable. In particular, individuals adapt their aspirations … to their experience. Studies of aspiration level adjustment in situations in which information on the performance of others is lacking indicate that decision makers revise aspirations in the direction of best performance but retain a bit more optimism than is justified by that experience. Thus, current aspirations can be approximated by a positive constant plus an exponentially weighted moving average of past experience. … [However] [t]he world is more complicated than … a simple model would suggest, of course. Aspirations adapt not only to one's own experience but also to the experience of others. They can become attached not just to the level or reward but to the rate of change of reward. They do not adapt instantaneously, and they appear to adapt upward more rapidly than downward. As a result, deviations in a negative direction seem to be more persistently noticed than positive deviations. This "predisposition to dissatisfaction" is, of course, a strong stimulus for search and change in situations where it exists" (March, 1994:22-3).

Aspiration levels are not fixed, but change with the uniqueness of particular decision makers and the experience of those who are involved in processes of firm adaptation. By stressing the differences, and indeed the tension, between the actual level of aspiration and outcome achieved, firms are able to motivate themselves towards particular aspirations. In other words: decision making requires a longing towards that aspiration, though it might never be reached. Furthermore, it is important to note that it is not satisfaction per se which move people to act; dissatisfaction does: "[H]igh satisfaction, per se, is not a particularly good predictor of high production nor does it facilitate production in a causal sense. Motivation to produce stems from a present or anticipated state of discontent" (March & Simon, 1958: 71).

While the received behavioral theory of search stresses the role of how aspiration levels change in the firm's adaptation it does not directly explain the origin of aspiration levels;

they are already in existence, and may then change in response to various internal and external events and dynamics. Moreover, although it is important to recognize the role of prior experience in changing aspirations, we are interested in situations where prior experience are lacking (e.g. ignorance) among those who make decisions relevant to the firm's adaptation. Equally interesting is the question how prior knowledge limits imagination. In order to see what explains the origin of new (and not only modified) aspirations we need a perspective which stresses the imaginative abilities and its limits in adaptive processes.

2.1.2 The bounds of rationality

The theory of rational choice and an associated focus on maximizing expected utility has indeed been dominating the economics profession for long. By contrast, the behavioralist literature (e.g. March, 1978; Simon, 1955,1956; Simon 1976) explicitly calls into attention (a) the boundaries of rationality which make human cognition imperfect, and (b) their implications for organizational adaptation. To Simon (1956), one reason why rationality is bounded is limited cognitive capacity of humans when facing complexity. A complex system, Simon argues, is "one made up of large number of parts that interact in a nonsimple way. In such systems, the whole is more than the sum of the parts, not in an ultimate metaphysical sense, but in the important pragmatic sense that, given the properties of the parts and the laws of the interaction, it is not a trivial matter to infer the properties of the whole. In the fact of complexity, in in-principle reductionist may be at the same time a pragmatic holist" (1962:468). It is because of this complexity, that decision makers will experience the limits of their cognitive and informational processing capabilities. To cope rationality with complexity while at the same time conserving on the mental resources, decision makers take resort to rules and standard operating procedures. The concept of bounded rationality, thus, captures the idea that the limitations of human decision makers should be added to the host of other technical limits decision-making faces. March (1978:590) explains: "It started from the proposition that all intendedly rational behavior is behavior within constraints. Simon added the idea that the list of technical constraints on choice should include some properties of human beings as processors of information and as problem solvers. The limitations were limitations of computational capability, the organization and utilization of memory, and the like. He suggested that human beings

develop decision procedures that are sensible, given the constraints, even though they might not be sensible if the constraints were removed. As a short-hand label for such procedures, he coined the term 'satisficing' " In contrast to maximizing, the notion of *satisfacing* recognizes that decision making under conditions of bounded rationality is driven by the search for alternatives that are good enough (measured against some existing aspirations) rather that optimal.

Although bounded rationality is the central assumption of the behavioural theory of the firm, its usage in the conceptualization of search remains largely focused on limited computational capacity. As much as it is important to recognize the impact of limited computational capacity of humans, the notion of bounded rationality remains one of bounded applicability if reduced to this aspect alone - and this is especially true in situations of genuine uncertainty. The reduced notion of bounded rationality is essentially not able to capture situations of 'truly bounded rationality' (Radner, 1996); situations where dynamic search becomes important, where new aspirations need to be created from scratch rather than old ones changed and modified. By focusing on the difficulties in finding the suitable solution within complex, but already existing systems, the boundaries of rationality are merely 'reflections of people's computational ability' (cf. Langlois, 1997:12; 1990, Loasby, 1989).

But there is more than that to the notion of bounded rationality. Simon (1976) has early asserted that if future consequences of present decisions are known in a fragmentary manner only, 'imagination' must supply the 'lack of experienced feeling' in attaching value to them (p.81). More importantly here is that in the received theory of search, genuine uncertainty is hardly embodied – not least because no genuinely new aspirations and targets can logically occur within a system which is per definition pre-existing. In order to address situations of genuine uncertainty and to introduce 'dynamic search', that is the process through which new aspirations are created, we need to expand the concept of 'bounded rationality' to move it beyond the aspect of limited ability to compute in the face of complexity by incorporating limited imagination. To address this question we draw on inspirations from the economists, George Shackle (1961,1979) and Frank Knight (1921). In section three we shall address the process of dynamic search.

2.2 Uncertainty, Surprise and Imagination

Surprise and imagination play important roles in the firm's adaptation under conditions of genuine uncertainty; situations where problems need to be identified, structured, imagined, before new aspirations takes shape. In a world of rational choice, by contrast, there is no room for surprise and imagination: "Rational choice, choice which can demonstrate its own attainment of maximum objectively possible advantage, must be fully informed choice…. The paradox of rationality is that it must concern itself with choosing amongst things fully known; but in the world of time, only this is fully known which is already beyond the reach of choice, having already become actual and thus knowable. Rational choice, it seems, must be confined to timeless matters" (Shackle, 1972: 245-6). But theoretician have, as Shackle rightly asserts, a 'stark choice': "[sh]e can reject either time or rationality" (1972:xi). If we claim unbounded rationality there will be no room for temporality and for duration. On the other hand, if we allow temporality and duration, there is no ground for claiming 'unbounded rationality' (cf. Langlois, 1984).

Uncertainty, imagination and surprise are real-time phenomena[2]. Leaving the Newtonian concept of time and the assumption of time-reversibility aside, time is seen here as something "whose essence and also whose existence involves its continuous movement and continuous evolution" (1958:14). Real-time connects the past to the present through experience, memory and expectations of individuals in time (O'Driscoll and Rizzo, 1985, chapter IV). 'Moments' become a connecting passage between past and future, the duration of which is subjectively contained (Shackle, 1958). Shackle argues that "each of us has in the very act of living, the time in which we sense, perceive, feel, think, imagine, and decide. From this inside view, the time of our actual psychic experience is but a moment, utterly solitary in its isolation from all other moments. It is what I would like to call the solitary present or the moment in being" (1959:285).

In this process perspective, perceiving time is not only irreversible, it is subjective and context bound and translates in conjunction with other subjectively perceived features of

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[2] Shackle was very close to the French philosopher, Henri Bergson, in his view on time and his insistence on the continuity of always incomplete and heterogeneous "duration". The idea that the ceaseless emergence of psychological events constitute "true" time is of course a violation of the Newtonian concept of time as being analogue to space filled up with events (Capek, 1971:91).

reality into different individual judgment. For example, decision makers taking part in the firm's adaptation may judge issue-urgency, hastiness of action, slow motion, or hesitating behavior of other decision makers differently from their own judgment. Although decision-makers involved in the firm's adaptation live in the same moment of time, individual perception of duration of that moment is subjective and thus differs. This carries serious implications for our understanding of processes of search in the firm's adaptation. As soon as we allow 'real-time' to pass, bounded rationality in a theory of search requires the consideration of bounded imagination which may restrict the creation of, or worse still, completely prevents new aspirations in situations of genuine uncertainty.

2.2.1 Risk, Uncertainty and Genuine Uncertainty[3]

Uncertainty can be distinguished from risk (Knight, 1921)[4]. To Shackle (1966) uncertainty obtains when "the possible consequences of an act are not listable" (p. 75) and to Knight (1921) uncertainty denotes situations where there is 'no basis of any kind for classifying instances objectively.' Distinctly, risk denotes situation where such a basis exists, instances are classified, and estimated value may be attached to that instances. Risk refers to repetitious events, and it is assumed that the decision makers are able to list outcomes to relevant choices and estimate the corresponding probability distribution. By contrast uncertainty, cannot "by any method be reduced to an objective, qualitatively determined probability" (Knight, 1921:231). To Knight (1921) and to Shackle uncertainty arises in cases of unique events. For example, when "[b]usiness decisions deal with situations which are far too unique … for any sort of statistical tabulations to have any value." (Ibid:232)

In the case of uncertainty, it is important to classify particular instances in the first place - for unless instances are themselves estimated no value can be attached. Genuine uncertainty, in a Shacklian sense, goes further than both, risk and uncertainty. It includes additionally the recognition that the future contains no states, no facts, nor events which are there to be

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[3] Though not referring to either Shackle or Knight, Daniel Kahneman and Amos Tversky in a similar spirit talk about 'variants of uncertainty' and the role of expectation and surprise on discussing expectancies (Kahneman & Tversky, 1982). They stress what they term 'perceptual uncertainty' which is aimed to incapsulate the element of surprise in perception and thus, relies more on beliefs than on action.

[4] Compare Mises (1949) for a similar distinction between 'case' and 'class' probability.

classified;. hence there the unlistability problem. Instead, genuine uncertainty requires processes of dynamic search which lead to the imagination and creation of such states, facts and events based on experimental judgment and choices in the present. Here action-outcome frameworks do not exist ex-ante, they are imagined and created.

To both Knight (1921) and Shackle (1972: 96) uncertain situation require conjectural judgment, and "choice does not consist in comparing the items in a list, known to be complete, of given fully specified rival and certainly attainable results. It consists in first creating, by conjecture and reasoned imagination on the basis of mere suggestions offered…, the things on which hope can be fixed." Moreover, under uncertainty, prior knowledge (e.g. experience embodied in routines or individual expertise) may give no reason to believe certain futures to happen – but it might give reasons to disbelieve that particular futures happen. For example, decision makers in a newspaper firm might not know the impact of internet business on its traditional business, but although they reasonably assume that internet business will not leave traditional business untouched, its impact and responding moves remain unimagined. Moreover, when prior knowledge is a limited guide for adaptation and genuine uncertainty prevails, the question becomes relevant how to understand the bounds of imagination and the limitations of what is 'deemed possible' (Shackle, 1979) in the creation of new aspirations.

2.2.2 Surprise and Disbelief

A useful starting point in this respect is the notion of 'potential surprise' (Shackle, 1961, 1966). To illustrate, suppose "that a little distance from me in a tube train I see an English friend reading a book with easy enjoyment. I cannot see the title of the book. I shall not be in the least surprised if the book turns out to be in English or French, and only a little surprised if it turns out to be in German. I shall be more surprised if the book … be in Italian or Spanish, still more surprised if it is in Dutch, and astonished if it is in Welsh. As to the possibility of its being a manuscript in my own handwriting, which I am conscious of having locked away in my desk a few minutes earlier, I feel able to exclude that hypothesis completely; should it prove true, the intensity of my surprise would be as great as I am capable of feeling." (Shackle, 1966:31).

For an extended understanding of dynamic search in situations of genuine uncertainty three things merit consideration: First, potential surprise is a function of disbelief in a particular event.[5] Secondly, potential surprise requires prior imagination, for unimagined events prevent to attach disbelief in any sense. Moreover, absent imagination, complete ignorance prevails and lethal surprise may set an end to the firm's adaptation. Finally, we expect that potential surprise provides occasion for experimental learning. If true, one can conjecture that dynamic search involves processes that engage the creation of disbelief. Furthermore, when potential surprise based on prior imagination allows for experimental learning, the creation of new aspirations depends not only on the creation, but also on the negotiation of degrees of disbelief because the extent of disbelief will differ among those involved in the firm's adaptation. It is through negotiation among individuals that "degrees of disbelief" and associated occasions for collective learning are created.

So far we have highlighted the role of potential surprise. Crucially potential surprise depends on prior imagination, but what limits imagination and what is 'deemed possible'? and how do decision makers dis-engage with such limits in the process of dynamic search - at least partially?

2.2.3 Imagination and its Bounds

In the first place, choice in situations of genuine uncertainty depends not on probabilities of expected outcomes, but more upon imagination of possibilities. Imagination is directed to the future and to the past. Thus it concerns choices among imagined experiences (Shackle, 1964: 12), whereby the past is employed to imagine the future. Imagination, in turn, is

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[5] In particular, Shackle suggests: "Disbelief is an intellection, something which has, in itself, form rather than intensity. What psychic experience can we find, that will reflect these forms as intensities? There is one emotion which directly springs from the combination of some formal kind or source of disbelief, and an actual taking-place which beliefs that disbelief. This is the feeling of surprise. The individual may be supposed to ask himself: How much or little should I be surprised if, with no relevant change in my present knowledge, such-and-such occurred? Potential surprise seems to me a practical link between formal and emotional disbelief" (Shackle, 1983:34).

constrained by what decision makers deem possible (Shackle, 1961,1979). By imagination we mean here the individual and/or collective formation of ideas, emotions and belief in future things, facts, states, and realities. These have not been experienced before, but courses of action which lead to their creation are deemed possible (whether or not this turns later out to be the case). Clearly, imagination involves emotions of confidence despite adversity and though beyond past experience. Both are important, for emotions without thoughts are blind and thoughts without emotions are impotent. "In order to imagine sequels to…a present choice, in order thus to experience an anticipate enjoyment (salutary through its possible inducement of action), or an anticipative apprehension (salutary through its warning against exposure to disaster) the chooser needs an alphabet and a language with which to give form to the possible sequels of a choice. This elements must, then, have in some sense an emotive content or at least an emotive capacity or potential" (Shackle, 1979:22).

While imagination is triggered through perceived genuine uncertainty, it is also limited in important ways. There are "degrees in which imagination can be constrained. With total absence of constraint it is mere fiction, fantasy, or daydream, ... to play its part in decision, imagination must be constrained to be congruous with what the decision maker knows of the nature of things in general ... Decision is an operation of an individual mind, and for such decision only those things count which belong to that mind, which are available to it and are sanctioned by it. For us, in attempting to analyze decision, possibility means the absence of fatal obstacles within the decision maker's knowledge; it means possibility, of some degree, registered and admitted by him" (Shackle, 1961:11-12). Note that imagination is not only contrained by ignorance, that is, what decision makers do not know. But it is also contrained by prior knowledge of decision makers; that is, what decision makers take to be the case. Additionally, imagination must recognize experienced grounds: "There must be some grounds for choosing, but they must be inadequate" (Loasby, 1976:5).[6] While thought and emotions in imagination cannot lay their hands on the complex interplay of the decision ground's constituencies in its totality, they can actively dispense with its particular rigidities through the creation of disbelieve; they help bracketing conclusion while choosing.

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[6] See Augier (1998) for an extended discussion on Shackle and the paradox of choice.

Consequently, in situations of genuine uncertainty, imagination involves the recognition of ignorance, the inadequacy of prior grounds for choosing, and the plasticity of the past. The past is experienced, but memory is more than recall and repetition of though. It is active reconstruction. The future is undetermined. It is also unpredictably brought about through intentional action. It is thus an essential feature of imagination that the bounds of what is imagined to happen in the future are subject to judgment based on beliefs and interpretation of what has happened in the past. Once these beliefs and interpretations are recognized as conjecture rather than ethereal truth, the past may be retold, the burden experience places on imagination may diminish, and the choice to dispense with what has been thought to be known creates space for the novel.[7] It is in this sense that 'deemed possibility' is judgment (Shackle, 1979) and processes of dynamic search gain momentum.

This section has argued that dynamic search is especially relevant in situations of genuine uncertainty, and that dynamic search involves surprise, imagination and disbelief. We are now in the position to define dynamic search and to examine sub-processes of dynamic search in greater depth.

3. Dynamic Search II: Processes and Activities

Dynamic search is defined as the process through which in situations of genuine uncertainty, with the help of experimental judgment, imagination, and active disbelief, new aspirations are created. Here we examine three sub-processes related to the concept of dynamic search. These include experimentation and play, creation of disbelief, and

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[7] Note that we do not argue that imagination requires unlearning (Hedberg, 1981). The past is not eradicated, deleted, or needs to be forgotten for imagination to happen. Instead, it is actively dealt with and its conclusions are rearranged to imagine the future by dispensing belief in its determinate consequences

disengaging limitations of imagination. The discussion sheds light on the question how aspiration levels come about?

3.1 The Role of Experimentation and Play in the Creation of Aspirations

In seems clear in the context of genuine uncertainty that new aspirations requires not merely combining existing ideas/technologies/knowledge, but also an element of imagination (Shackle, 1979; March, 1994). To March (1994) motivation and decision making is linked to the fact that people make sense of the information (cf. Weick, 1995), on which they base their decisions. In speaking of 'decision engineering' he stresses that because of the uncertainty and complexity involved, "the links between processes and outcomes cannot be assumed" (March, 1994:224). However, we may make sense of the decisions by its 'intelligence'[8]: "The intelligence of an action is defined in terms of its outcomes. An action is defined as intelligent if, after all the results are in (including possible changes in preferences and identities), it has satisfied the wishes of relevant parties" (Ibid: 224). Obviously, output-intelligence, if it ever can be reached, is not only hard to accomplish, but provides little guidance in situations were aspirations are lacking in the first place and these are needed to guide the firm's subsequent adaptation.

More importantly, March (1994) argues, although choice involves experimental activity, it may not be limited to search guided by existing aspirations. Experimental choices may additionally concern the creation and discovery of new aspirations through playfulness (March, 1971, 1994, chapter6) and experimental judgment. In particular, 'playfulness' involves "the deliberate, temporary relaxation of rules in order to explore the possibilities of alternative rules" (March, 1971: 261). By playing, we do not have to act in a consistent manner - thus providing an entry to experimentation, irrationality, and foolishness (Ibid.). Additionally, playing and experimentation facilitates 'enjoyment', 'curiosity', and 'discovery'. Important for dynamic search is that playfulness can support what produces the longing for new aspirations. When the firm's adaptation under conditions of genuine uncertainty does not start from some well-defined aspiration, but rather as a longing for reason and hope; when for the moment-in-being we cannot rely on predefined alternatives

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[8] To March "intelligence is an ex post concept. … [therefore] [o]utcome intelligence … may be indeterminate" (Ibid.). This is similar to Shackle's analysis of choice.

for choosing, 'enjoyment in playfulness' provides an important intellectual and emotional set-up in acting toward aspiration.

3.2 Creation of disbelief

Dynamic search involves processes of creating disbelief. For Shackle, recall, disbelief denotes the judgment that a particular fact, state of affairs, or outcome can be brought about through action which lead to their creation; but those actions are neither concretely known in their consequences, nor expected to be accomplished without obstacles. Further, imagined states with a high degree of disbelief yield potentially higher degrees of surprise than a state which is deemed perfectly possible (and thus, would yield only a little degree of potential surprise). Creating reasoned disbelieves, thus, must rest on a divergence (of some sort) between the imagined and what is deemed possible.

Moreover, note that disbelieves, as argued above, have a cognitive as well as emotional component. Although human thoughts may are hard to measure, [w]hat is measurable in some sense in connection with thoughts is feeling" (Shackle, 1979:87). "Feeling", he continues, "quite evidently has a range of intensities. Then can possibility be linked to feeling of some sort? The feeling in whose engenderment possiblity-judgments can play a part of that is surprise. A report from the field, which had been judged impossible, causes an extreme degree of surprise. No feeling of surprise will be engendered by a report which was deemed perfectly possible" (Ibid:87-88).

Recall further, that imagination can be directed towards the past and the future.[9] When directed to the past, prior knowledge embodied in the experience and expertise of individuals and in routines, may through the creation of disbelief be dispensed, rearranged, bracketed for the moment in being to create space for the novel. Disbelief, may also be created through selecting and focusing on particular traits of the past, disjoining them from their relations to other traits, to employ them for the creation of new aspirations. Just as the people of the Italian Renaissance have tried to resurrect the drama of antique Greece, and

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[9] Cf. Shackle (1979:89): "We are prisoners of the present who most choose in the present on the basis of our present knowledge, judgements , and assessments".

through the process have created the Opera as a form of arts, so may firms create new aspirations by isolation, reinterpreting, and utilizing elements of their past to imagine the future. From this perspective, indeed, 'unlearning' is an unclear concept. Furthermore, coupling disbelief in the determinism of past in conjunction with a feeling of departure fuels the creation of new aspirations. Directed to the future, creating disbelief involves the recognition of obstacles to courses of action which are deemed possible in general, but remain fuzzy in their particular contours. Anticipating obstacles emotionally and cognitively, sensing their specificities, and acting toward overcoming them in conjunction with a feeling of longing yields surprise and provides chances to learn, when obstacles turn out to be of other kind than previously expected.

Importantly, in the process of dynamic search, creating disbelief facilitates surprise and learning. In particular, since disbelief is also an emotional concept, it is connected to the dimensions of the agent's cognitive and perceptual abilities and their possible changes. Those abilities create the longing which the creation of aspiration-levels requires. Based on imagination, the decision maker chooses outcomes which yield a certain degree of surprise when actualized in thought, conversation and imagined experimentation. This process is the process in which new aspiration levels come about.

3.3 Disengaging limitations of imagination

Imagination is a real-time process (cf. earlier discussion) which makes knowledge constantly change and thus, our decisions and search will also change and alter as long as it continues. Although dynamic search will not converge fast to a specific point, it might be reasonable to argue that it will be bound, or restricted in intensity, once a certain future aspiration emerges - dynamic search may be saturated when viable aspirations begin to form common grounds (e.g. new aspirations) which facilitate the coordination of action (cf Mahnke & Aadne, 1998). In order to reach this point in time, it is important to disengage limitations of imagination.

Through experimental forming of judgments and though experiments, surprise and disbelieve are changed. Moreover, the correction to mistaken belief, overcoming failure of experimental judgment are needed as well. Additionally, the speed with which such

correction occurs is an important element when overcoming the limitations of imagination. Human nature, Shackle suggests, dictates that such processes are contantly going on, through doubt and the state of thought being one of unfinished business. If the decision maker is to attain a good state of mind, he "must satisfy his practical conscience that he has examined the question of possibility so far and fully as he can. He must search for obstacles that need by no means be obvious. He must in thought traverse the route of the imagined course of affairs and see that it is clear. While such search and examination are in process, however instantly ready for each turn and contingency of this inspection the prepared mind may be, the chooser's state of thought will be that of unfinished business, of doubt, unreadiness to give judgment. Such a state of thought will not, in the midst of the tide of affairs, be a merely occasional or exceptional one, but the stuff of the human condition" (1979:91). It is thus in the active creation of disbelief and doubt that we find the clue to the continuation of dynamic search; it is through removing the bounds of what is deemed possible, the speed with which this happens, and the recognition that doubts and experimentation dispense with what has been thought impossible in the past, that the creation of new aspiration is supported.

4. Summary

Analyzing the gaps in theories of individual organization and social choice March comments: "Goals are thrust upon the intelligent man. We ask that he act in the name of goals. We ask that he keeps his goals consistent. We ask that his actions be oriented to his goals. We ask that a social system amalgamate individual goals into a collective goal. But we do not concern ourselves with the origin of goals. Theories of individual organization and social choice assume actors with pre-existent values" (March, 1971: 256). We could not agree more with the analysis. That this assumption is not warranted in any case has increasingly shown by the recent contributions of March (1994) among others. In the case of genuine uncertainty, where initial aspirations are lacking, and old ones fail to provide guidance for the firm's adaptation, to assume initially potent goals is utterly wrong.

The more companies find themselves in situations of genuine uncertainty, the more a more fully developed theory of dynamic search becomes relevant. Starting from the question "How do aspiration levels come about in situations of genuine uncertainty?", we have

argued in this paper that through dynamic search and associated processes, insights can be gained into how firms create the conditions for subsequent adaptation and survival. To this end we have suggested to extend the notion of bounded rationality beyond its received meaning of bounded computational ability to additionally denote limited imagination (cf. Kreiner and Augier, 1998; Loasby, 1994) This extended concept of bounded rationality is central to the concept of dynamic search in that (a) it explicitly makes real-time an issues and addresses the inherent unknowledgeability of the future, (b) calls for a theory that addresses the question how aspiration levels come about, and (c) invites to ask how through the processes of dynamic search old believes are dispensed and/or creatively used to invent the future. Moreover, we have suggested that three processes can be associated with the concept of dynamic search, including experimentation and play, creating disbelief, and disengaging limitations of imagination. Of the three, the first has been discussed by March (1994) and set in the context of exploration (March, 1991). However, here we are less concerned with the balance of exploration and exploitation, and more with the question of how does exploration works in the creation of new aspirations in situations of genuine uncertainty. That makes necessary the inclusion of the second process, creating disbelief and surprise, which we adopt from Shackle (1979), but extend it beyond its received use. While Shackle (1979) has seen disbelief as important in the imagination of the future, here, we argue that disbelief in the creation of new aspirations is equally useful when directed to the past. Additionally, at the time being it seems most pressing to further refine exactly what are the bounds of imagination and how they can be overcome. The following table illustrates and compares the traditional understanding of search with the concept of dynamic search:

	Traditional Theory of Search	*Dynamic Search*
Relevant Situation	• Dissatisfaction with current performance relative to existing aspiration	• Uncertainty, Genuine Uncertainty
Initial Condition	• Aspiration levels exist and are subject to modification	• Initial aspirations do not exist and are subject to creation
Aspects of Bounded Rationality	• Bounded computational capacity	• Bounded imagination

Processes	• Search induced by deviations between existing aspirations	• Search induced by genuine uncertainty • Experimentation; Creating Disbelieves
Relevant Authors	• Cyert and March (1963)	March (1994); Shackle (1961, 1979); Knight (1921)

5. Conclusion

One of the points in this paper has been the claim that the ideas of George Shackle are valuable in explaining the role and importance of imagination, the creation of aspiration levels and hence, in setting out the contours of a theory of dynamic search. It is not accidental that Shackle has been given central priority in this paper and that another important input came from James G. March writings on experimentation and play.[10] Both theorists and their subject matters share important characteristics. What they share perhaps most is that they are rooted in a subjectivist tradition, where emotions, intuition, play, and imagination are allowed to play a role. Those issues have to some extent be eliminated in the theories of decision making and the theory of the firm. For example, in rational choice theory (e.g. Neumann & Morgenstern, 1944), all that is left for the agents to do is to maximize expected utility. This is seen as the basis of all action and decision making. Furthermore, although important theories of the firm, for example transaction costs theory (Williamson, 1975, 1985), have incorporated 'bounded rationality' in the form of limited computational ability, any theory that purports to deal with dynamic adaptation may usefully incorporate the extended notion of bounded rationality as suggested in this paper. Approvingly, Williamson (1998) has recently admitted that issues of learning are important and that transaction cost theory - and we may add most of the other economic theories of the firm which currently have currency - is remiss in this respect.

As a remedy, moving away from the rigid assumption of rationality and additionally, from reducing bounded rationality to bounded computational ability, creates space for considering 'truly bounded rationality' (Radner, 1996), where agents may act under

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[10] See Kreiner and Augier (1998) for an elaboration on the similarities between Shackle and March

conditions of genuine uncertainty, and where stable criteria for maximization cannot exist. In such a world, boundedly rational agents base their behavior on a number of rules of thumb and act. Moreover, they not only adapting to given aspirations, but also towards building new aspirations. Those aspirations are created in a process of active disbelief and in the process of imagination as suggested in the concept of dynamic search. Such aspirations cannot be assumed ex-ante and a theory of dynamic search requires to explain its origins.

In particular, we have argued in this paper that the concept of dynamic search provides a good starting point for a theory of search that explains more fully how aspiration levels come about in situations of genuine uncertainty. Creating aspiration, in turn, helps producing a structure, a framework (cf. Loasby, 1994) in which to operate, to recognize and correct failure, and to facilitate adaptation for and beyond survival. Starting where Shackle would probably have, we suggested that in this process of creating aspirations we find dynamic search – search for alternatives not yet known, driven by imagination. When old ways of looking at the world fail to deliver the aspiration needed to guide the firms adaptation under genuine uncertainty, dynamic search may provide a first step for dynamic adaptation. Future research that builds on the concept of dynamic search may more satisfactorily provide the foundation for a more general process theory of dynamic adaptation under genuine uncertainty. This clearly is a promising area of future research; and it contributes to the intellectual venture the behavioural theory of the firm has begun in 1963.

Although the concept of dynamic search is related to the previous literature it goes beyond its insights, for 'dynamic search' begins to answer previously unposed question, including "How do aspiration levels come about" as opposed to "How do aspiration levels change?" Indeed, the concept of dynamic search needs further elaboration, however. And as with all fields of new intellectual ventures the concept rises more questions than it answers. Specifically relevant for future research are the following two issues and pressing questions:

- How to augment the concept of dynamic search more closely with the complexity of the market process which constitutes the evolutionary environment within which the firm's adaptation takes place? It is obvious that the neoclassical theory of the functioning of the market is far removed from the concept of dynamic search. This may include a more

careful consideration of market-process and evolutionary theories (cf. Foss, 1997; Mahnke et al, 1998).

- How to refine the sub-processes suggested in the concept of dynamic search, in particular disbelieve and imagination? While some research in this direction is already under way, both on a foundational (Kreiner and Augier, 1998) and more applied level (Mahnke and Aadne, 1998) much, much more research is needed before we have reached theoretical saturation in a process theory of dynamic adaptation.

Today situations of genuine uncertainty become more frequent, and it is time to move dynamic search and dynamic adaptation under genuine uncertainty from the periphery to the center, in both, decision making research and the theory of the firm.

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