SF Interviewing Protocols as Evolutionary Algorithms

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Abstract:

Darwin's algorithm has been shown to be Nature's way of exploring the "solution space" for problems related to survival and reproduction. This paper shows how SF conversations (as used in therapy and brief coaching) can be framed as a Darwinian algorithm to explore the "solution space" for the problems clients bring to the session.

> Evolutionists can stride across human-related subjects at the highest level of intellectual discourse, in the same way that evolutionary biologists are already accustomed to striding across biological subjects *(Wilson, 2007, p.6)*.

> What I am advocating is a point of view, a way of looking at familiar facts and ideas, and a way of asking new questions about them *(Dawkins, 1982, p.1)*.

Introduction

Darwin's Theory of Evolution generated strong reactions from the moment it was published. Back in 1868, one of Darwin's detractors, Robert Beverly MacKenzie, anonymously attacked "Darwin's strange inversion of reasoning": "In the theory with which we have to deal, Absolute Ignorance is the artificer; so that we may enunciate as the fundamental principle of the whole system, that, IN ORDER TO MAKE A PERFECT AND BEAUTIFUL MACHINE, IT IS NOT REQUISITE TO KNOW HOW TO MAKE IT [MacKenzie's capitals]. This proposition, will be found, on careful examination, to express, in condensed form, the essential purport of the Theory and to express in a few words all Mr. Darwin's meaning: who, by a strange inversion of reasoning, seems to think Absolute Ignorance fully qualified to take the place of Absolute Wisdom in all the achievements

of creative skill." (Dennett, 1995, p. 65). As the American philosopher Daniel Dennett commented (ibid.): "exactly!"

SF practice shares with Darwin's theory this "strange inversion of reasoning": in keeping with Mr. MacKenzie's wording, SF practitioners believe (de Shazer, Dolan, 2007) that in order for clients to come up with perfect and beautiful solutions, it is not requisite that the practitioners know how to make them. This common ground shared by evolutionary theory and SF practice is no accident: as I will argue in this paper, both evolutionary theory and SF practice are evolutionary algorithms.

SF practice and evolutionary processes: clues to a shared core

Many are the clues to a tantalising analogy between SF practice and evolutionary processes:

- the key idea of evolution is that there is **no designer** behind the marvellous adaptations and elegant solutions that we find in nature (Dawkins, 1986); the key idea of SF practice is that no pre-designed "expert solutions" are offered, suggested or otherwise presented to the client (de Shazer, Dolan, 2007).
- both in evolution and in SF practice there is an emphasis on "**what works**". A common shorthand for describing the main tenets of SF (de Shazer, Dolan, 2007) is: *if it works, do more of it. If it's not working, do something different*. According to Coert Visser, this is how Beinhocker, author of "The Origin of Wealth", describes evolution: "in effect, evolution says, 'I will try lots of things and see what works and do more of what works and less of what doesn't'". Or in the words of the American psychologist Gary Marcus: "if something works, it spreads. If it doesn't work, it dies out" (Marcus, G., 2008, p. 6).
- evolution uses **pre-existing features** of successful individual organisms as building blocks in the creation of new

adaptations to meet environmental challenges (Gould, 1993). In SF, the practitioner works under the assumption that "no problem happens all the time; there are always exceptions that can be utilized" (de Shazer, Dolan, 2007, p.3), i.e., there are **pre-existing experiences** in each client's past that can be used as building blocks in the creation of new solutions to meet the current challenge. Nothing is added by the SF practitioner.

- evolution operates on what is already there, nothing more – e.g., ear bones were evolved from jaw bones (Gould, 1993). SF practitioners work on what the client brings to the session, nothing more (Jackson, McKergow, 2002; Berg, Szabó, 2005). Therefore, solutions that species (in evolution) or individuals (in SF conversations) arrive at might not be **perfect** (Dawkins (1982) lists no less than 6 constraints on perfection in evolution), but as long as the solution works, everybody is happy. Evolution is not about perfection, it is about "obtaining an outcome that is good enough" (Marcus, 2008, p.11). For example, let's consider the human spine: it originally evolved to support the weight of a four-legged creature, and the price to pay for having our hands free is back pain for many of us. However, it is a solution that works, and since standing clumsily is better than not standing up at all, we are all happy with it (Marcus, 2008). If we were to go back to the drawing board, we would want to redesign many of our awkward adaptations, like our spine or the inverted retina. But that is not how nature works – we evolved from what was already there. Similarly, a client might get a solution that is not quite the "textbook" solution; but, if it works for the client, that's great. For example, a client might get to the solution of looking at a co-worker in a specific way to stop his annoying behaviour; that might not be the textbook definition of "assertive communication", but if it works for the client, we are all happy with it. Just as "Natural selection is only as good as the random mutations that

arise" (Marcus, 2008, p.9), SF is only as good as the behaviours that the client is able to generate.

- in evolution, **adaptations cannot be foreseen** in advance, nor can we determine what life forms will evolve. As Gould (1989) says, if we were to play the tape of life again, results might be very different because of different chance events and different environmental challenges. Despite the fact that the Darwinian process is determined, its outcome is not: "each step proceeds for cause, but no finale can be specified at the start" (Gould, 1989, p.51). Something similar happens in SF conversations: it is not possible to foresee beforehand which kinds of solutions will evolve during the session. That is a very different position from that of traditional practitioners, who – once they diagnose a patient or determine the nature of a client's problem – can apply a specific solution taken from a standard set of pre-packaged treatments or action plans (de Jong, Berg, 2002).
- both in evolution and in SF practice, what works and what does not work is determined by **feedback from the environment**, not by any pre-conceived standard. There is no external norm or reference that serves as a benchmark to evaluate the "quality" of the solution: it is simply a process of "finessing ignorance by randomly generating a candidate and then testing it out mechanically" (Dennett, 1995, p.53). For example, any life form that can survive works by definition; there is no platonic set of ideal life forms for each environment that is used to evaluate how close we are to the ideal template – "no regulation comes from on high" (Gould, 1993, p.149). Similarly, in SF conversations, any result that makes the client happy works by definition; there is no ideal standard of a lifestyle, no theory of the "correct" way of doing things or of evaluating how close we are to this ideal template – "every case is different" (Jackson, McKergow, 2002).
- evolution is not a theory about what kind of life forms should evolve, given specific environments; nor is it a theory about why life forms evolve; rather, it is **a theory**

about what steps are necessary for life forms to evolve and meet specific environmental challenges (Dennett, 1995). Similarly, SF is not a theory about what kind of solutions (treatment, advice) should be applied to specific problems; nor is there an underlying SF theory about why it works and why it facilitates the emergence of solutions; instead, SF is a theory in the sense that it tells us **what steps are necessary** for sustainable and effective solutions to emerge in a coaching or therapeutic conversation.

All these clues point to a fundamental affinity between the core of SF and the core of evolution – in essence, they both belong to the same class of theory: they are not explanations, they are **algorithms**.

The idea that **evolution is a universal algorithm** is the main point of Dennett's book, "Darwin's Dangerous Idea" (1995).

The idea that **SF interviews are algorithms** is based on how SF interviewing is taught in coaching and therapy: as a process that has a sequence of stages, each one characterised by a set of questions to ask (e.g., in the appendix of the book "Interviewing for Solutions", under the heading "Solution-Building Tools", we find "protocols", "questions" and "common messages" for each phase of the interview).

My claim, therefore, is not simply that SF protocols are algorithms (that would be uninteresting); my claim is that they are Darwinian algorithms.

To make my case we need to formally define what evolution is and what SF is.

What is Evolution?

Darwin's dangerous idea, as the American philosopher Daniel Dennett (1995) calls it, is a simple, mindless algorithm that is substrate-neutral and (assuming limited resources) that requires three ingredients (Dennett, 1995; Blackmore, 1999):

a) variation
b) selection
c) retention.

Let's clarify these terms.

An *algorithm* is "a finite sequence of instructions, an explicit, step-by-step procedure for solving a problem" (Wikipedia). And "while there is no generally accepted formal definition of 'algorithm', an informal definition could be 'a process that performs some sequence of operations'" (Wikipedia). A computer program is an algorithm. A recipe is an algorithm. A defined set of questions is an algorithm.

Substrate-neutral means that Darwin's algorithm can run on anything: animal populations, brains, computers, social interactions.

Regarding the three ingredients needed for Darwin's algorithm to function, here is how Wilson (2007, p.17) describes them:

Variation – "you and I differ in just about anything that can be measured, such as height, eye colour or quickness to anger".

Selection – "then we add consequences. The differences between you and me sometimes make a difference in our ability to survive and reproduce".

Retention – "for many traits, offspring tend to resemble their parents".

What is SF?

According to de Jong and Berg (2002), SF is an offshoot of the empowerment movement. Rich in philosophy but poor in techniques, the empowerment movement had to wait for the solution-building approach pioneered by Steve de Shazer and Insoo Kim Berg to add some teeth and muscle to its body of aspirations (ibid.).

The actual precursors of SF are rooted in family therapy and in the interactional systemic view: mutual interest in the work of the Mental Research Institute brought Insoo Kim Berg and Steve de Shazer together. And from that encounter, the Brief Family Therapy Center of Milwaukee, where SF originated, was born (Visser, 2008).

It is not in the scope of this paper to introduce solution-building. However, a brief description of the modus operandi of a SF practitioner could be useful, as a reference for the purpose of establishing SF as an evolutionary algorithm:

Whereas almost all other approaches to change have problem-leading-to-solution sequences, SFBT develops solutions by first eliciting a description of what will be different when the problem is resolved. The therapist and the client then work backward to accomplish this goal by carefully and thoroughly searching through the client's real-life experiences to identify times when portions of the desired solution description already exist or could potentially exist in the future (de Shazer, Dolan, 2007, p.2).

Of Typing Monkeys and Fit Weasels: SF & Evolution as Evolutionary Algorithms

To make our case that SF, at its core, is an evolutionary algorithm to generate solutions in a coaching/therapy session, we are going to introduce two elements:

1. the Monkey Theorem and the Weasel Program
2. the concept of Fitness Function.

Exhibit 1: The Monkey Theorem & the Weasel Program

In its original form, the **Infinite Monkey Theorem** states that "a monkey hitting keys at random on a typewriter keyboard for an infinite amount of time will surely type a given text, such as the complete works of William Shakespeare" (Wikipedia). Arguments about monkeys and typewriters are now common in the debate about evolution (Dawkins, 1986).

Here is how the theorem is used in such a context:

In order for a monkey to type the thirteen letters opening Hamlet's soliloquy by chance, it would take 26 to the power of 13 trials for success. This is sixteen times as great as the total number of seconds that have elapsed in the lifetime of our solar system (Shermer, 1997, p.150).

This is where creationists usually stop in their argument: life can't possibly be "by chance".

However, as we learned, evolution is not to be confused with random variation, since there are two additional elements to it: selection and retention. Following again Shermer in his reasoning:

But if each correct letter is preserved and each incorrect letter is eradicated, the process operates much faster. How much faster? Richard Hardison (1988) wrote a computer program in which letters were "selected" for or against, and it took an average of only 335.2 trials to produce the sequence of letters TOBEORNOTTOBE. It takes the computer less than ninety seconds. The entire play can be done in about 4.5 days in 1988 processing speed – N.d.A.

The British scientist Richard Dawkins started this line of reasoning in his book "The Blind Watchmaker", published in 1986. To make the case that evolution is cumulative, he introduced the "**Weasel Program**": a simple computer program that, again, simulating a monkey typing randomly on a machine, generates a string of 28 letters and spaces. The goal is to reproduce the sentence "Methinks it is like a weasel". If the procedure were totally random, the probability of stumbling upon the target sentence would be extremely low, since there are 27^{28} possible combinations, according to the "Weasel Program" Wikipedia entry. However, if given a random sequence of 28 letters and spaces, the computer, from one generation to the next, keeps what works (the letters that match the target sentence) and changes what does not work (the letters that do not match the target sentence) until a match is found; the process is much faster.

Here is a possible iteration, taken from the Wikipedia article on the "Weasel Program":

Generation 01: WDLMNLTDTJBKWIRZREZLMQCO P
Generation 02: WDLTMNLT DTJBSWIRZREZLMQCO P
Generation 10: MDLDMNLS ITJISWHRZREZ MECS P
Generation 20: MELDINLS IT ISWPRKE Z WECSEL

Generation 30: METHINGS IT ISWLIKE B WECSEL
Generation 40: METHINKS IT IS LIKE I WEASEL
Generation 43: METHINKS IT IS LIKE A WEASEL

Of course, if we had to repeat the algorithm again, we could get to the target sentence in 40 generations or 80 generations or any other number of generations. As Jenny Clarke pointed out when discussing this topic at the SOL 2009 conference, each iteration is unique. For example, using an online Applet created by Max Scott, and trying 5 times in a row, I got the target sentence "Paolo is writing a paper" in 184, 275, 158, 190 and 130 generations.

The Weasel Program and similar software applications that demonstrate the power of evolution can be summed up in terms very familiar to SF practitioners: *if it works, do more of it (repeat the letter generation after generation); if it's not working, do something different* (if the letter is not a match, keep changing it until it is a match, until it works). As a matter of fact, Mark McKergow, as far back as 2001, developed simple software to illustrate this point. His software has the added bonus of calculating the time difference between the target sentence being generated randomly vs. being generated via selection of random mutations (McKergow, private communication).

Exhibit 2: Fitness Function & Fitness Criteria

Evolution is open ended: as Gould (1989) repeatedly stresses, there is no goal, no specific life form to which Evolution necessarily leads. The same is true of SF: one of its main tenets is that the future is *both created and negotiable* (de Shazer, Dolan, 2007).

Of course the past, i.e., what is there, constrains the range of possible solutions (Gould, 1983). For example, the architecture of a body determines the range of possible adaptations – it can't redesign itself from scratch. In the same sense, the range of possible solutions for a client is constrained by his or her experiences, skills and proclivities.

Within those constraints, though, both in Evolution and in SF practice, anything goes.

However, in the example cited above of the Weasel Program, we had a "target sentence". How does that fit with the open-endedness of Evolution?

To understand this, we need to introduce the concept of **Fitness Function** (regarding the different meanings of the term "fitness" as used in biology; see Dawkins, R., 1982, 1999).

A Fitness Function is a concept used in the theory of Evolutionary algorithms. More specifically, a fitness function determines the environment within which the solutions "live". In an evolutionary algorithm, "candidate solutions play the role of individuals in populations and the fitness function determines which solution is more adapted to that specific environment" (according to the Wikipedia entry for Evolutionary algorithm).

For example, let's consider the problem of optimising truck routes using an evolutionary algorithm, as described in the 'Fitness Landscape" entry of Wikipedia. Initially, a population of solutions is generated randomly; a fitness function determines how "good" each solution is; the truck routes with higher fitness are selected for and undergo mutation and recombination, until a satisfying solution is found. Here is the crucial point: the solutions are mindlessly evolved, but the fitness function is set – the criteria to evaluate how good each solution is are set.

In evolution, fitness functions can be loosely thought of as requirements for survival, i.e., those requirements a biological entity needs to satisfy in order to survive and reproduce given a specific environment. For example, in a desert environment, a successful organism (i.e., one that can meet the basic fitness criteria of evolution, survival and reproduction) needs to cope successfully with hot days and cold nights, with little water, little vegetation, and so on. In other words, we do not know which solutions life will find to enter a specific ecological niche: however, we can say that given an ecological niche, the requirements that life forms need to

satisfy to survive and reproduce in that niche are indeed present.

Incidentally, that is why in evolution we can't talk about "progress": rather, we can talk about the degree of adaptation to a specific environment and its challenges (Gould, 1993. We can talk of progress in evolution, though, within such an adaptationist framework (see Dawkins, 2003).

In SF practice we invite clients to articulate their preferred future, i.e., what will be different once the problem is solved – e.g., by asking the MQ. **The preferred future becomes a fitness function:** it determines the criteria used to evaluate possible solutions – the environment in which solutions "live", the requirements a solution needs to satisfy in order to work for clients (Radatz, 2004).

The preferred future determines the viability of a solution for the client because it makes sense in the client's world, just like "methinks it is like a weasel" is a viable sentence for us because it makes sense in the English language.

For example, in describing what would be different once the problem is solved, a client might say that she would be more self-confident. In looking for exceptions, "self-confidence" becomes a fitness function, i.e., it is a criterion to evaluate the client's experience and any solution the client might come up with. *The therapist and the client then work backwards by carefully and thoroughly searching through the client's real-life experiences to identify times when portions of the desired solution description already exist or could potentially exist in the future* (de Shazer and Dolan, 2007).

And the more a specific strategy increases the client's self-confidence, the more it is adapted to the client's "preferred future environment", and the more it can be a solution for the client.

Incidentally, that is why in SF we can't talk about ideal solutions; rather, we can only talk about the degree of adaptation of a solution to the client's "ecology" (social environment, abilities, situation...).

Now it's time to put together the pieces of the puzzle

a) **Fitness Function**
   - The "preferred future" acts as a **fitness function**.
   - It is the criterion against which we evaluate the emerging solutions.
   - It is the implicit criterion of comparison when we ask "what is better?", a question that requires clients to identify which actions bring them closer to their preferred future (i.e., better compared to the recent past while using the preferred future as an assessment criterion – e.g., a shy person can feel better if she stays at home alone, but that is not "better" if her goal is to become more social and to go out and meet people.).
   - It is the target sentence "methinks it is like a weasel" in the sense we have clarified before.

b) **Variation**
   - Clients' experiences, skills, resources and behavioural repertoire are the requisite **variation**. When we ask clients to do something else, we are actually asking for an increase in variation so that we can have a larger pool of behaviours to select from.
   - One of the main tenets of SF is that no problems happen all the time; there are always exceptions that can be utilised (de Shazer, Dolan, 2007). We could rephrase that principle in evolutionary terms as a principle of requisite variation: first we can think of all the behaviours ever exhibited by a client in the "problem situation" as a population, and each occurrence as an individual. Since no two occurrences are exactly the same, if only for the fact that they happen in different points in time, then we can say each individual is different ("no problems happen all the time") and some individuals are more successful than others, i.e., they have a higher fitness ("there are always exceptions that can be utilised").

c) **Selection & Retention**

- The basic SF recipe "*if it works, do more of it; if it's not working, do something different*" is our **selection** criterion.
- **What works** are the letters of the target sentence that are already there, e.g., **methings it is**w**like** b **wecsel**. Or, more appropriately, as in the original Weasel Program, "what works" are the sentences that more closely approximate the target sentence: in real life we do not need to have a complete match to make progress – we need only an approximation. That is why it is useful to go back to the original Weasel Program that operates on mutant sentences rather than mutant letters: by selecting, generation after generation, the sentence that most closely approximates the target sentence and allowing only that sentence to replicate, we capture the idea of gradual approximation.
- We stick with what is already there. If we were to use Dawkins' words we can say the following: the farther we leap from what the client is already doing and from what the client knows how to do, the lower the probability that the resulting change will be viable, let alone an improvement. Gradual, step-by-step walking in the immediate vicinity of already discovered exceptions seems to be the only way to find other and better useful behaviours (see Dawkins, 2003, p.86).
- We encourage clients to **keep doing what works and to do more of it**: keep doing it means repeating the behaviour; doing more of it means increasing its frequency and recombining it with other strategies so it can be applied to different situations. We encourage clients to change what is not working, i.e., the letters that do not match the target sentence, by doing something different, i.e., flipping letters, until a satisfying solution is found.
- In evolutionary terms – where all the client's behav-

iours in the problem situation are a population and where the useful exceptions are the individuals with higher fitness – we want the client to select the individuals with higher fitness ("what works") and make them breed ("do more of it"), while discarding individuals (behaviours) that were not useful and replacing them with different ones to keep variation going ("if it is not working, do something different").

The bottom line

- **Evolution solves the problem** "of finding, in a gigantic mathematical space of all possible organisms, that tiny minority of organisms that is adapted to survive and reproduce in available environments" (Dawkins, R., 2003, p.82).
- **SF practice solves the problem of** finding, in a gigantic mathematical space of all possible solutions, that tiny minority of solutions that is adapted to work for specific clients in their specific environment.

SF tools as steps of an Evolutionary algorithm

In light of what we've said before, SF tools can be thought of as designed around the **two key elements** of an evolutionary algorithm:

1) establishing a fitness function
2) generating candidate solutions and systematically comparing them to the fitness function to select the most viable ones to be replicated and recombined.

1) **Establishing a fitness function**: *Goal-negotiation questions, the MQ, "Suppose. . ." questions*.

   As we discussed above, eliciting a preferred future from clients means **establishing a fitness function** for the deployment of the SF Evolutionary algorithm in the conversation. The more detailed we can make the

fitness function, the better the SF Evolutionary algorithm will be in finding elements of the desired future already taking place.

The key feature of SF techniques in establishing a fitness function is that it invites clients to jump to a scenario where the issue they are working with has been miraculously resolved.

This feature is what allows the SF algorithm to sidestep a problem often associated with a Darwinian search process in the "solution-space": the risk of being **trapped in a "local optima"**. To illustrate this problem, I need to introduce the concept of *fitness landscapes* (originally introduced by Wright in 1931).

A fitness landscape is a 3–D representation in which the altitude of the "mountains" stands for fitness, and latitude and longitude stand for some factors of individual design (Dennett, 1995, p.77). In a fitness landscape, operating according to the criterion of "what is better" means climbing the slope of the mountain we happen to be on; we might even reach the peak of that mountain. However, that mountain might not be the highest peak of the mountain range (i.e., the best of all possible solutions). And we are sort of trapped there, because to climb a nearby, higher peak, we would need to travel down to the valley below (i.e., getting worse for a while to get much better later) only then to climb again, this time on the slopes of a different peak, hoping this new one is higher.

SF techniques (like the MQ or the *Suppose...* question) that bring clients to an ideal scenario beyond the problem are a way out of local optima. These questions take clients to the highest peak in a single leap and allow them to see the view from there – from the top of the highest mountain itself!

Scaling questions (or *Exception-noticing* questions) then help us find our position on the slope of this highest peak and help us find our way up from there. This is the genius of the SF Evolutionary algorithm: techniques to

"snap out" of the current situation and jump directly into the desired scenario – the highest possible values for the fitness function; and a systematic, iterative exploration of what works and its incremental application. Notice that in SF conversations, information about what works is constantly fed forward as parts of the preferred future, just as much as the preferred future is fed back as a fitness function in the evaluation of what works. This dynamic back and forth movement is what makes SF unique.

2) **Generating candidate solutions:** *Exception-finding questions, Scaling questions, Relationship questions, Resource-enhancing questions*.

The purpose of these techniques is to go for details in clients' experiences, find what works and do more of it. In Evolutionary algorithmic terms, their purpose is to search for individuals in the population of clients' behaviours, find the "individuals" that are the best fit to the fitness function, replicate and recombine them to generate new individuals that are even closer to the desired solution.

Let's go back for a moment to our "Weasel Program". Many of the "Weasel applets" work by having a "breeder" that generates variation and a "scorer" that evaluates how close the different values are to the target sentence. The breeder takes "solutions" rated by the "scorer" as closest to the target sentence and then recombines and reproduces them.

Notice how this process is exactly homologous to the "Scaling questions" technique used in SF. Using evolutionary algorithm terms, when asking "Scaling questions" as SF practitioners we do as follows:
- we ask clients to score their present or recent experience: specific behaviours, situations or perceptions; the reference point is their preferred future set as the value 10 on the scale.

- we ask clients to go for useful details along the scale, finding elements for the breeder to recombine.
Notice that in Evolutionary algorithms the scorer does not tell the breeder what the solution is; it just tells the breeder how close it is to the solution.

In the same manner, a SF practitioner using Scaling questions invites clients to score their own experiences, going for details and exceptions and finding out how close they are to the desired state. But the SF practitioner does not tell the client what to do nor ask clients what they should be doing. In fact, when talking about movement on the scale, the SF practitioner invites clients to describe "how they would know" they are a step further on the scale, not "what they need to do" to be a step further on the scale, as pointed out by Szabó, Dierolf and Meier (2009) in their book on coaching.

By answering the question "how would they know they are a step further on the scale", clients are informing their own scorer of the fitness criteria for that level of the scale, while at the same time engaging the breeder to search for (in recent experience) and come up (by recombining useful strategies) with behaviours that would match those criteria.

The SF assumption that clients have the resources they need and that "there are always exceptions that can be utilized" (de Shazer, Dolan, 2007, p.3) is therefore nothing more than the assumption on which every Evolutionary algorithm is built, namely that the breeder will generate useful recombinations.

Conclusion

I have shown how SF interviewing protocols satisfy the basic conditions of an Evolutionary algorithm: variation, selection and retention, given limited resources.

The hallmark of the SF Evolutionary algorithm is its usefulness in evolving solutions that fit clients' unique predicaments.

The SF algorithm acts as a catalyst, i.e., it speeds up the natural process of exploration of the "solution-space":

a) it purposefully **establishes a fitness function**, i.e., the preferred future, honing it thanks to questions focused on behavioural details, on third-party perspectives and on interactional dynamics.
b) it purposefully **searches for and it assigns a score to behaviours** according to the fitness function.
c) it purposefully encourages clients **to replicate behaviours with the highest score and to recombine them** to breed new useful behavioural solutions.

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