

JOEP LANGE  
REPORT  
INSTITUTE

ACTIVISM

## Insights from Dan Ariely: Applying behavioral economics to treatment adherence



**INSIGHTS FROM DAN ARIELY: APPLYING BEHAVIORAL ECONOMICS TO TREATMENT ADHERENCE**

Good adherence to treatment and preventive care can decrease healthcare costs and result in better health outcomes. Yet so far, behavioral aspects of medical care are hardly applied in daily practice. Behavioral economics is the field of study that aims to understand human decision-making by combining economic principles of rationality with concepts from psychology on the irrational human being. The Joep Lange Institute (JLI - see box 1) recognizes the decision-making processes as a crucial ingredient for any market to work and vital for the health market, as Marleen Hendriks, Director of Research and Innovation at JLI emphasizes: “We believe that combining clinical excellence with insights from behavioral economics will be the key to more success.”



**Box 1. The Joep Lange Institute**  
 The Joep Lange Institute combines science, activism, and pragmatism with the aim of making health markets work for the poor. It analyzes the obstacles and failures in healthcare today and promotes concrete solutions for healthcare quality, delivery, access and finance. With public and private partners, the Joep Lange Institute develops and tests these on the ground, and advocates to scale those that have real impact for real people.

The Joep Lange Institute and behavioral economist Dan Ariely are working together on several research projects on mobile technologies for health, such as M-TIBA, a mobile health platform in Kenya that allows people to save, borrow, and pay for healthcare at very low costs. Ariely and his team are conducting studies to test the optimal strategy to get people to save for health, seek care and adhere to care.

With this in mind a workshop on treatment adherence was organized by JLI on November 9th inviting medical doctors, scientists and special guest Dan Ariely and his team. Dan Ariely is leading behavioral economist and professor at Duke University. He founded the Center of Advanced Hindsight and is one of the chairs of the Joep Lange Chair and Fellow Program. The aim of the workshop was to brainstorm together on patients' difficulties to adhere to chronic care and the potential solutions to overcome these barriers.

The first part of this workshop report addresses the question; What are the main behavioral problem in adhering to chronic treatment plans? The section is followed by an overview of possible barriers to adherence that are explained by Ariely from a Behavioral Economic perspective. Next, the report provides insights on how to set up an intervention that aims at behavioral change. Three novel e-Health programs for cardiovascular disease (See box 2 for background on cardiovascular disease) prevention care were presented and discussed through a behavioral economics lens: HATICE, VITAL10 and AHTI's home-based hypertension care delivery model. The report ends with a conclusion on the learned lessons. Potential joint research projects were anticipated as a final outcome of the workshop.

**Box 2. Cardiovascular prevention care: Why we should care about poor adherence**

Cardiovascular Diseases (CVDs) have vast implications for quality of life, life years and costs. It is the number one killer of non-communicable disease and accounted for 31% of all global deaths in 2012 (WHO, 2016). Its potential for prevention through lifestyle changes and drug treatment makes it the perfect disease to fight, but unfortunately also the perfect candidate for poor treatment adherence. Research shows that even though drug treatment for CVD risk factors is effective in preventing deaths, adherence is only around 60% in secondary prevention. Adherence to lifestyle recommendations in secondary prevention of cardiovascular events is even lower than for drug adherence with less than 30% of the patients following diet and exercise recommendations. A surprising one third of all patients continue smoking after a cardiovascular event (Chow et al., 2010). And when looking at chronic diseases in general, 50% of the patients do not take their medication as prescribed. (Chowdhury, 2013)

In the Netherlands the statistics show a similar picture with a high prevalence of CVD deaths (27% of all deaths) and a high prevalence of CVD risk factors. Around 40% of the total population is overweight and lives a sedentary lifestyle and 23% of the Dutch population is smoking. Adherence to medication and smoking cessation is consistently low; 77% of patients do not adhere to lipid-lowering drug treatment in primary prevention and even after experiencing an event still 31% of patients are not adherent (Balder et al., 2015). Success rates of smoking cessation are low; 15% of smokers attempt to quit but only 32-52% manage to actually stop smoking (Nagelhout et al, 2015).

Overall the statistics paint a gloomy picture on treatment adherence. This is bad news. Good adherence is fundamental as WHO quotes in their report on adherence (WHO, 2003): "[...] increasing the effectiveness of adherence to interventions may have a far greater impact on the health of the population than any improvement in specific medical treatments" (Haynes et al., 2000). Good treatment adherence is possible in long-term therapy as we see from the presented AGEhIV Cohort Study. In this cohort compliance with HIV drug treatment is incredibly high with approximately 95% of the patients taking their drugs as prescribed. However, in the same cohort cardiovascular risk management is poor with only half of patients on antihypertensive medication reaching blood pressure targets.

## **BARRIERS TO ACHIEVE TREATMENT GOALS**

Prior to the workshop, experiences of physicians attending the workshop were gathered with regard to poor adherence in long-term therapy. The most frequently stated problems identified on the doctors' side were:

- Motivating patients is not the task of the doctor
- Too little time to properly talk to the patients
- Paternalistic attitude

On the patients' side, the following behavioral problems were described as counterproductive to drug adherence:

- Lack of motivation
- Lack of information
- Patients don't experience the benefits of the medication
- Side effects of drugs

In course of the subsequent discussion on these barriers the medical doctors discussed various ideas around the phenomena of non-adherence of their patients to life saving long-term treatments. These ideas were then explained by Dan Ariely from a behavioral economics perspective. This first encounter between two sciences: Medicine and Behavioral Economics resulted in the following conceptualizations of barriers to treatment adherence: 1) Information  $\neq$  Behavior change, 2) Shame, 3) Internal vs. External disease, 4) History of disease, 5) Hyperbolic discounting, 6) Social pressure, 7) "What The Hell"-effect, 8) The never ending race and, 9) Measurement of outcomes.

### **Information $\neq$ Behavior change**

Physicians are trained to educate their patients. Patients should know everything about their health state, the cause of their disease, and how to treat it.

However, throughout history there was not one situation where just information led to change in behavior, explains Dan Ariely, but nonetheless, "there is no focus on how to change behavior of patients within the curriculum of trained doctors. Doctors know almost nothing about how to change behavior although this is what they are supposed to do."

### **Shame**

In reference to the behavioral problems on the patients' side Dan Ariely asks us to consider to what degree we blame people for their own fate. Weight is a classic example, he explains: "[...] in the whole argument it is calorie in, calorie out and if you are obese it is your fault, you're are not managing it well", placing a lot of shame on patients, making them responsible for having the disease.

### **Internal vs. external disease**

The notion of shame is related to the concept of internal vs. external disease. Whereas a virus, as for example HIV, is acquired externally, other chronic diseases such as cardiovascular diseases (CVDs) are developed by the person himself through sedentary lifestyle, a poor diet, smoking and other bad habits. In the case of a virus, the inhibited host pushes for defeating the virus. However, with CVDs the patient eventually fights himself and the shame that might come with the development of the disease.

### **History of disease**

The history of the disease matters when looking at potential barriers to good chronic care management, for example the history of HIV/AIDS is very different to CVDs. Twenty-five years ago people watched their families and friends dying from AIDS often within 12

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months of being diagnosed. The development of new drugs changed the outcomes dramatically from death to survival. CVD on the other hand is a non-communicable disease with a slow and mostly invisible progression rate. Although CVD can be fatal, the outcome is far into the future.

### **Hyperbolic discounting**

The perspective of time to event is defined as hyperbolic discounting in Behavioral Economics and describes the little importance we give to events that will happen in many years from now. Ariely explains this concept based on the example of smoking: "Imagine the probability of dying from the cigarettes that one is chipping away every time versus a situation where one in a million cigarettes had a little explosive in it and if you smoke it you will die on the spot. That would be a very different feeling even though the probability stays the same." The challenge is to find a way to bring these long-term effects to the short term to convince people to change their behavior.

IRRATIONAL



### **Social pressure**

Social pressure can be a barrier but also a push for adherence. Take smoking; socially there is a strong belief that passive smoking is very harmful (also supported by research), which has led to a negative perception of smokers leading to smoking becoming less socially accepted than it was a decade ago.

### **“What The Hell”-effect**

The “What The Hell”-effect describes the rejection of one part of the treatment due to failure in the other. In the care of CVDs, taking pills as prescribed is relatively little effort but following lifestyle recommendations can be harder. Ariely explains, that the failure of changing our lifestyles can also have a negative impact on drug adherence. One may stop medication because of having a hard time accepting partial adherence.

Another example of the “What The Hell”-effect is rejection of the treatment once the disease was experienced. For example, someone had experienced a cardiovascular event and thus, rejects treatment based on the false belief that the damage is already done confirming the underlying all-or-nothing notion of the “What the hell”-effect. This assumption is also related to the concept of “The never ending race”.

### **The never ending race**

Chronic diseases usually require lifelong treatment. Patients are basically participating in a race they are never going to win, says Ariely. They will always be glued to their pill box. “That’s why Americans love surgery”, says Ariely, “it removes the disease and therefore, the dependency on pills and the shame that comes with it”.

This might also partially explain why people living with HIV have good adherence to their HIV-medication. In HIV a level of defeat of the virus can be achieved, which gives people a feeling of success that is lacking in other long-term treatments such as for CVDs.

### **Measurement of achievement**

By what means to give patients a sense of achievement and accomplishment, is yet another difficult questions to answer. Commonly, physicians tend to use outcomes such as blood pressure increase/decrease as a measure of success.

But measures vary over time and are hard to control for (standard deviations are large), says Ariely. Therefore, they are inappropriate in measuring motivating outcomes as Ariely puts it “being motivated by a long term goal that fluctuates over time is just not part of the human capacity”.

HEALTH

OUTCOME

## HOW TO DESIGN A BEHAVIORAL INTERVENTION?

Considering the various behavioral barriers to treatment adherence discussed above, interventions that aim at changing behavior should target these barriers. In the workshop three novel e-Health interventions were presented and analyzed through a behavioral economics lens. One of the programs, the home-based hypertension care delivery model by AHTI, was developed in collaboration with Dan Ariely and his team. The analysis of these three interventions resulted in several advices from Dan Ariely on how to design a behavioral intervention. Ariely suggest to focus on 4 main questions:

1. Why do people behave the way they do?
2. How should the interventions be used?
3. What are the barriers to use the application and how to remove them?
4. How to sustain involvement in an e-health application or any other program/ care plan?

### Focus on the details

Further, he recommends to focus on the details. explains that previous research showed the importance of the little environmental factors for behavior change. Interventions that target the immediate environment of patients, for example, by adjusting their shopping list or moving the pill box into eyesight are most successful, as Ariely explains "It is about the little details in life that matter".

HATICE	Vital10	AHTI's Home-Based Hypertension Care Delivery Model
<p>Healthy Aging Through Internet Counselling in the Elderly (HATICE) is an innovative, interactive internet platform to optimize treatment of cardiovascular disease risk factors in the elderly. The main components of the intervention are self-management, tailoring, interactivity and the human factor in form of a motivational coach who helps to set reachable goals. Users get access to a platform, where they get to meet their coach and set their goals. Participation is self-determined and users can contact their coach when needed. Additionally, lifestyle groups are available to show successes and keep users motivated.</p>	<p>The Vital10 Personal Health Management Platform aims to improve chronic care management and prevention of chronic disease by targeting the 10 crucial health risk factors contributing to various chronic diseases. Users of Vital10 are provided with simple devices to monitor their risk factors from home. Physicians and coaches provide support with measuring and goal setting. Users receive feedback on how well they are doing on reaching their goals in combination with a scoring system. Points earned for good behavior can be exchanged for benefits.</p>	<p>The home-based hypertension care delivery model was designed in collaboration with Dan Ariely. The aim of the intervention is to provide homebased hypertension care including self-monitoring and (in a later phase) self-treatment through a mobile application on a smartphone. Mobile health technology allows remote monitoring of large groups of patients through a digital web-based portal. As behavior is a major driver of health outcomes in chronic conditions and technology offers great potential to modify behavior at low costs, behavioral incentives to improve patient adherence will be built into the system.</p>



The participants of the workshop.

### **Decide on an approach to incentivize desired behavior**

Behavior can be incentivized either by means of outcome or process. These two approaches underlie different mechanisms. When focusing on incentivizing the outcome it is important to think about what kind of incentive is given. Studies show that monetary incentives are successful in changing processes but have little effect on outcome. Ariely gives the example of pupils who receive monetary incentives to read books. Pupils do read more but it has little impact on their study results. In contrast, telling the parents to study a book with their child has a positive effect on the outcomes i.e. the study results of the pupils.

### **Granularity of outcome**

According to Dan Ariely, the granularity of outcome reporting to the individual is a crucial component in the success of behavioral interventions. He explains that people don't understand variance very well. Perceived changes in weight for example are a normal variation rather than real change. The downside of precise measurements such as weight is that each negative feedback such as an increase in weight is more demotivating than positive feedback (loss of weight) is motivating.

Ariely therefore, suggests a different unit of measurement. Instead of showing the weight with decimals, the scale only shows whether the outcome is positive (weight loss or stable weight) or negative (weight is above a certain standard deviation).

Alternatively, physicians can focus on the process rather than outcomes, for example whether the patient walked for 30 minutes a day or whether he ate 3 pieces of fruits a day. In cases where there is little control over the outcome, such as the fluctuating weight on a scale, Ariely prefers to incentive processes over outcomes.

PROCESS

### **How paternalistic should we be?**

It is difficult to define when and to what extent physicians should take a paternalistic approach towards their patients. Shouldn't we let patients and users decide on what's good for them?

Ariely makes a clear case for a more paternalistic approach pointing out that focus groups as source of data for interventions can be dangerously misleading. He explains that focus group participants rely on their intuition when talking about their own motivations of changing behavior. However, "our theories about what motivates us deviate very much from what happens in reality", says Ariely. In general, people tend to act differently than they say.

He gives another example of a preferred paternalistic approach in reference to coaches and trainers who motivate users of health intervention. Ariely affirms that for the use of motivational coaches in interventions, accountability is a successful tool. According to Ariely, "accountability works best when the choice of contacting the coach is not up to the user. The user needs to know that the coach will check on him daily." However, he also emphasizes that in a large study on diabetes it was found that talking and understanding does little to changing behavior.

SCIENTIST

## **DISCUSSION & CONCLUSIONS**

One could argue that a coach checking on you is pretty much invading one's privacy and consequently ethical questions such as privacy issues and self-determination were raised during the workshop. Ariely takes up on this issue giving an example of health insurer Discovery Health where customers received a discount when buying healthy food. In this study patients were even willing to lose money to make themselves eat healthier. Ariely says that most of the times uptake is not a problem and with certain contracts privacy issues can also be solved.

In the subsequent final discussion round challenging questions were raised by the workshop participants: How do you deal with the often negligible effect of novel interventions in the bigger picture and the well-known failure of upscaling effective interventions? Shouldn't we just stop with all these small interventions and rather aim for environmental changes on societal level?

The utopian idea is born to take a small contained area in the Dutch countryside and investigate the ideal health environment. A researcher would finally be able to study the habits created through this environment. The outcomes would certainly be the ultimate proof for policy makers to implement changes on societal level.

"That would be ideal", concludes Ariely, "but I don't want to wait on that."  
His recommendation:

1. Focus on the little details of your patient's daily life
2. Focus on the processes rather than outcomes
3. Focus on positive feedback

It is our daily interaction with patients that target behavior that are our means to facilitate change in the healthcare setting.

**For further information and research ideas please send an email to [info@joeplangeinstitute.org](mailto:info@joeplangeinstitute.org) or visit [www.joeplangeinstitute.org](http://www.joeplangeinstitute.org)**

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INNOVATE