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The Functional Quality of Life (fQOL)-Model and its Application to the Coimagination Method

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The functional QOL model combines the existing approaches by linking the subjective representations of objectively measurable resources to their functional value for pursuing individually meaningful activities and goals. In this paper, we discuss the application of fQOL to improve and evaluate the effectiveness of interventions, in particular the coimagination method.

1. Paradox of Same Subjective Evaluation with Different Objective Resources

Quality of life (QOL) is increasingly being suggested as the central outcome variable in research on health-improving or preventive interventions in old age [Garratt, Schmidt, Mackintosh, & Fitzpatrick, 2002]. Currently, two main approaches for measuring QOL can be distinguished: objective QOL and subjective QOL. Both approaches, however, are problematic. What we focus on is the seeming paradox shown in Figure 1, where you can see the typical trajectories of objective functioning and satisfaction of aging individual [Martin & Kliegel, 2010]. We can observe the sensory or memory functioning or at least a large part of them, that there are declines in functioning when people reach older ages. However, the reported quality of life or satisfaction with life declines much less. The difference between them is the adaptive potential. The question is how is it possible even though you have decline in multiple domains of functioning, that subjective quality of life does not decline so much. We believe this is due to the active process of aging individuals orchestrating resources to achieve goals in real life. How this works deserves much more attention because it's not that older individuals overlook the changes that occur to them but its rather part of an active process of orchestrating available resources and that are at the heart of the functional quality of life model.

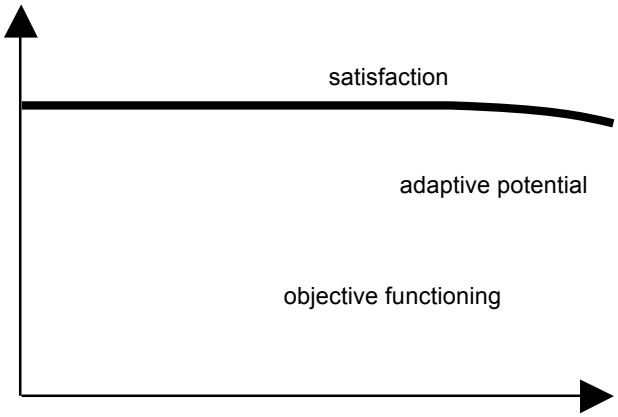

Figure 1: Adaptive Potential in Old Age

Most individuals with very low resources and most of the individuals with high resources typically will report high level of subjective quality of life [Staudinger, 2000]. This may be due to a difference in the meaning of the term quality of life in different individuals. Typically, what determines the quality of life of the individuals is not any single resource. Instead, in real life multiple resources are used to stabilize the higher-order function of quality of life. This is also known as a multi-dimensionality and multi-directionality concepts in gerontology.

The first assumption is that, although one resource has dropped to a low level, the quality of life is still supported by other resources. Lower level in one resource is compensated by others within the individual. This explains why even if you did improve any single resource such as for example episodic memory, it will not increase quality of life. In the best case, improved single resources make it easier to stabilize quality of life because more resources are available to orchestrate quality of life in more diverse situations.

The second assumption is that even if the resources improve or decline they do not necessary lead to higher or lower level of quality of life. And you can consider this for yourself, too. Assume your quality of life would completely depend on your current memory performance. As memory performance in the morning is relatively low and may drop in the afternoon, if your quality of life depended on your memory performance you would be a very depressed person in the morning and you would be a very active and enthusiastic person before lunch – but you are not. This is because your quality of life does not depend on one factor only. In fact, normal development is characterized by very small or no correlation between any of the resources and quality of life. Thus, one goal for a normalizing intervention based on these assumptions would be to get rid of the high correlation between a single resource and quality of life.

2. Functional Quality of Life (fQOL)

The question we are trying to answer is what process in between the status measurement of objective resource impairments and status measurement of subjective quality of

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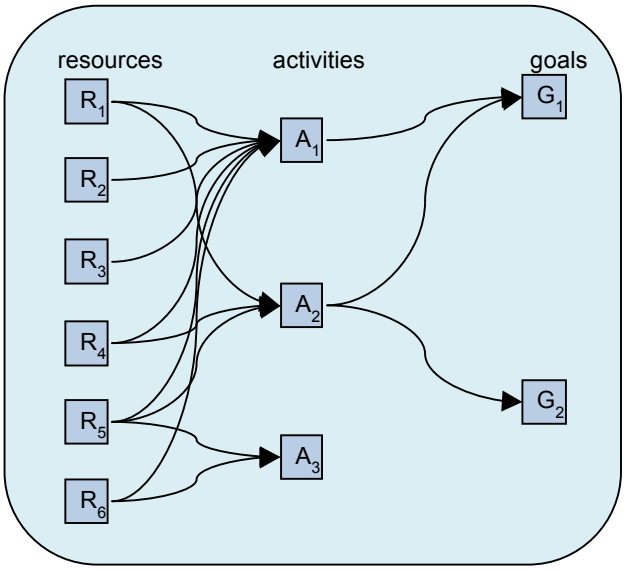

Figure 2: Functional Quality of Life (fQOL)

life leads to the stabilization of quality of life. We assume that quality of life is a process and, in essence, the ability to produce quality of life. It's not a status variable or a combination of status variables, but rather a dynamic process that leads to the stabilization of quality of life.

The cores of functional quality of life model are these assumptions. QOL is functional. That means you orchestrate different resources in different environments in such a way that you can achieve what is important to you. Let's say your autonomy or independence in everyday life, or maximization of your happiness or satisfaction or any other type of function that's important to you. We believe that your quality of life is not the result of your impairments or non-impairments or function, but the active orchestration of resources to optimize important goal functions. We believe that most individuals as they age are not necessarily motivated to improve the current level of happiness or quality of life or performance, but rather to stabilize it. That's why you typically may be willing to do walking exercises on a regular basis but are not willing to train ten hours a day: It is because you don't want to be an Olympic champion on 100 meters but rather would maintain the current level of function.

We also believe that quality of life is not determined by any single resource but multiple ones and there is no way you can ever maximize all your resources at the same time and you have to maximize as many of them as possible that are important to you at the same time. That is why multiple resource patterns can be equally good to produce the same level of quality of life. That explains why for example recommendations what to do to stabilize your quality of life can be quite different but they all may lead to the same result. That also suggests that there are more pathways to health and health stabilization than there are pathways to illness. There is only one pathway to illness. It is the combination of all risk factors. However, there are multiple ways of not having or having only some of risk factors that you can actively overcome and therefore stabilize the quality of life. So the search for one and only intervention that would lead in everyone to a stable quality of life is futile. In factindividual resource patterns are like individual fingerprints; that means interventions based on this model necessarily have to be individualized interventions.

We propose the solution to our problem, which is the functional quality of life model [Martin, Schneider, Eicher & Moor, 2012]. In Figure 2, you can see on the left hand side are indicators of resources. However, those resources are subjectively represented resources that you can measure by asking individuals if they believe that particular resources are sufficient to perform activities that are important for those individuals. So let's say it's important for you as an individual to be close to nature. Then the question is if your motor skills or cognitive skills or whatever skills you need to perform the activity are sufficient. This explains that functional quality of life can be stabilized or stable even when your objective resource level changes. So let's assume you are always close to nature because you are a farmer. You drive a tractor on your farm so you need driving skill, motor skills and strength. And imagine that those resources drop, namely your motor skills drop, so you cannot drive a tractor on your own farm. However, you can adjust the activity to gardening of a small garden. If you manage to see that your lower resources are sufficient to perform this different activity that achieve the same goal your functional quality of life can be stabilized. And that's why within this model, your resources are indicators as subjective assessments of their functionality. These resources are functional to perform the activity that's important to you.

As an intervention, we look for ideal activities which use as many of the individual's resources simultaneously as possible. Any activities that use a lot of your intellectual, social and other resources simultaneously are at the same time training all your resources and their orchestration. If we can simultaneously engage multiple activities and achieve exactly the same improvements in the orchestrated subprocesses as a specialized training of only one of them, then we can increase the efficiency of cognitive interventions compared to standard approaches by a factor of 10. Ideally those activities are either everyday activities that function and work like a training or cognitive or social abilities. And that's the work that we are conducting as a participatory research [Otake et al. 2011], [Otake, Nurzaman & Iida 2012]. Group conversation supported by coimagination method is one of the activities that use multiple resources simultaneously including intellectual and social resources, which is a better cognitive intervention than training one particular side of processes.

What we can also see is that to get the system going it is very important to look at the goals of the individual. So it's a key for improving functional quality of life that individuals have or find meaningful goals. So helping individuals to identify existing or new goals is essential for quality of life-improving interventions. Consider that for some people playing chess is tedious as long as it is not part of their goals, but for others who eventually decided chess is really what they want to do, they play this on a daily basis and they don't consider this as a training or tedious. So interventions based on this model can focus on how individuals evaluate the functionality of their resources, they can focus on their resources themselves, they can focus on finding activities that use more of your resources simultaneously and they can focus on providing individuals with potential or alternative goals.

3. Reported QOL Stabilization during Coimagination Session

Coimagination method is a method invented for training cognitive functions including episodic memory, division of attention and planning during everyday tasks - group conversation [Otake, Kato, Takagi & Asama, 2011]. It supports interactive group conversation through bringing feelings with images according to the theme, where allocated periods and

turns for each participant are predetermined, so that all participants play both roles of speakers and listeners.

One of the reported stories during coimagination session was of typical QOL stabilization. Here we report the story as a typical case study. The theme of the session was "my favorite things". The theme helps to investigate the goals, activities and resources which determine the participant's quality of life. The favorite thing which one of the participants reported was to bike an electric bicycle. This helps to enjoy another favorite activity, walking in the morning in a group. He originally enjoyed walking by foot but his motor function declined which made him difficult to catch up with the group. The goal for this activity is to enjoy social interaction and maintaining physical functions in a relaxed setting. Then, the alternative activity for him to achieve this goal was to participate in group walking by electric bicycle. In this way, he could train physical functions by peddling an electric bicycle as well as social functions by talking. If the participant could not find this alternative activity, in this case, to bike an electric bicycle, his quality of life might have declined. This is a typical way of stabilizing QOL, which gives ideas to stabilize the quality of life of other participants.

4. Measuring QOL

To measure QOL, one can ask individuals to name the five most important things which determine their current quality of life. It doesn't matter what you tell us, it only has to be the five most important things. That's the first step. Once you selected those, we ask you to rate each one of those areas as to how good they are from zero, that's the worst possible to a hundred, that's the best possible.

Suppose that we have an individual with a relatively high quality of life. Each of those five domains has been rated by a value of 80. Then, there is a third step after this. We ask the individuals how important those five domains are in relation to each other by distributing 100% weights between them. Here for example, a person would distribute the weight equally so the person gives 20 % to each of those five domains. Out of this, you can now calculate the individual QOL neasure. In this particular case it is 80 points (out of 100 maximally possible). The advantage of such a measure is that you can have the same quality of life even though these domains are very different, and of course the weightings could be also different.

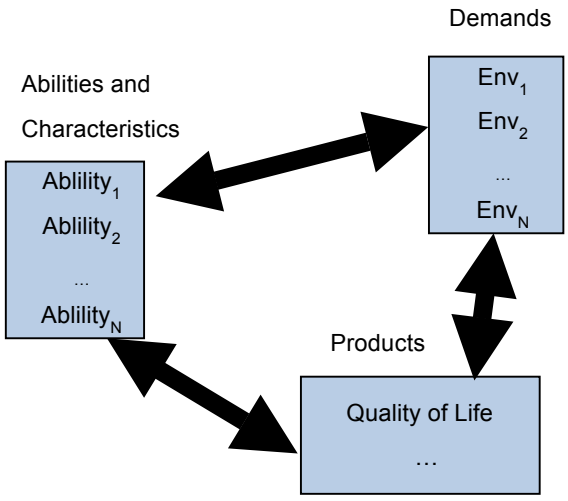

Figure 3 Orchestration Model of QOL

5. Orchestration Model of Quality of Life

Figure 3 shows a very simple orchestration model. On the lower side you see the outcome or conductor that is you. People try to state their quality of life that is optimal or acceptable to them. Ideally, quality of life is stable because the abilities match exactly the environmental demands that they encounter. Imagine that you are a travel guide in Tokyo and so far you have given guided tours in Japanese. Now in the meantime, you have learned English, German or Swiss-German, but your environment does not know about this. In this case, your abilities are higher than your environmental demands. And this typically leads to a decrease in your experienced quality of life. And what happens is that you tell your supervisor that you can do tours in other languages. Suddenly, your tours are guided tours for the Swiss people, then your higher abilities are again in balance with the environmental demands and your quality of life goes back to the optimal.

One interesting aspect of this orchestration model is that you can start at any element of this model. As environmental demands increase, this leads to an imbalance between ability and demands, decrease of quality of life, which should trigger ability activation. So through changing environmental demands you can create a training environment. You can also increase abilities to create the need to search for more variable adaptive environment. And that again, would lead to a stable quality of life. But you could also set higher goals for your own quality of life. That makes you unhappy with what you have or quality of environment you are currently in, that typically triggers to get into different environments, and in turn increasing abilities. Taken togetherthis is why eventually hardly any ability measure or any environmental measure or any quality of life measure can be used alone, because it's such a dynamic process. So what we do in our research now is to look within person how that dynamic process can be optimized or supported.

Quality of life in our approach is summarized as follows.

- Quality of life is the integrated representation of goals, goal-related activities, resources, environments, and the homogeneity of goal-related activities.
- Ability to represent simultaneously the pursuit of multiple meaningful goal-related activities is the ability you need at high or low levels of resources to produce such a high functional quality of life.
- Multiple suboptimal performance levels in multiple individual resources are the best that you can possibly do.

That's why we are not an Olympic champion of 100 meter run, but we are reasonably good in our walking performance and in our social performance and in our intellectual performance. It is because we are perfectly good in maximizing all of those abilities as much as possible. That has been overlooked in previous research.

6. Towards Individualized Adaptive Technology

To summarize, the thing what we are trying to do is to explain how individuals stabilize their own quality of life. It is the process that is actively orchestrated by the individuals or couples, and they orchestrate their resources and their functionality of the resources in such a way that allows them to produce a stable quality of life. So, what we are looking for are interventions to stabilize individual functioning. This is a true challenge, because if an intervention leads to stabilization it means its outcome does not show any change. Standard variance-dependent interventions and research designs cannot be used to examine the effectiveness of these interventions. The way we approach this is to demonstrate that with the stabilizing intervention, individuals are able to encounter and cope with more variable environments.

Individuals should be better in coping with new situations. It is important to stress that the notion of stability typically suggests that stabilities are the exact same level of quality of life. However, stabilizing within the range you are comfortable with that is the idea in our interventions. We then examine how people who remain healthy or have stabilized their quality of life. What do they have to do across their lives or life events or life situations to achieve this stabilization? Stories reported by healthy aging older adults during coimagination session provide variety of tips for the stabilization of the quality of life. We will be able to demonstrate that you do many different ways, to stabilize one's quality of life and there are still few ways leading to a low quality of life.

We want to demonstrate that different constellations and resource orchestrations are equally good in producing QOL. Therefore, we are not searching for that one or a couple of resources that are producing a certain quality of life, but the research question is which resources are needed so that they allow the stabilization of QOL. These five may be compared to the stabilization efficiency of five random factors or random processes that you assume have nothing to do with quality of life. And that's why we are trying to do to determine which resources are essential for individuals to stabilize the quality of life. Therefore, research for finding markers of healthy aging and stability in longitudinal studies is needed. What predicts the stabilization or the stability over time? Once we have more measurement occasions of multiple resources within individuals that can be done. Finally, we want to examine the range of constellations and guiding principles to explain stabilization within the individuals over time, because once we understand the individual level, we have the basis to design and test the efficiency of individualized quality of life stabilizing interventions. Because this requires to go into everyday lives of individuals, individualized technology, technology that allows to obtain what type of activities are performed in daily basis are what we really need. This is why we work together in our Swiss-Japanese platform and network to develop further those individualized adaptive technology assessment tools and eventually intervention tools. This is a field that has major potential not only to drive technology development, but also to be able to improve individually adaptive way to improve quality of life or at least to stabilize quality of life of aging individuals.

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